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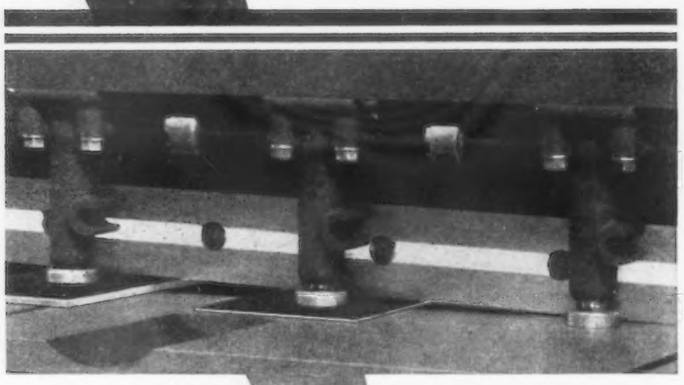

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..THE IRON AGE..

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Flexible Pension Fund Used for Unemployment Relief

By ROGERS A. FISKE
Western Editor, The Iron Age

UNUSUAL times call for unusual measures. The prime need of the present depression is relief for the unemployed. The Ilg company, which, as the accompanying article points out, has long conducted its affairs in the interests of its employees, by sharing profits and building up a pension fund, has found it possible to meet the current emergency through the flexibility of the provisions governing its retirement reserve. So far only the interest on its pension fund has been used for loans to unemployed, but there will be no hesitation in cutting into the principal if occasion demands.

FLEXIBILITY of organization and plan of procedure have enabled the Ilg Electric Ventilating Co., Chicago, to convert a pension fund to unemployment relief. This fund, after two and one-half years of slack business, remains intact as to principal, the load having so far been carried by the income from this fund. Should the present trend of business continue, this unemployment plan will be carried forward until, if necessary, the entire principal has been dissipated.

Policies in the interests of employees are not new to the Ilg company. The novel feature is the ease with which an established fund was diverted or its use modified in a crisis to meet an urgent need. For 25 years —the entire life of the company—it has had a profit-sharing plan. This quite evidently is one reason why 62 per cent of the employees have been with the company for 12 years or more.

How Profits Are Shared

The profit-sharing plan is essentially a reward of merit. It is a sincere effort to hold employees together year after year. Each employee receives a percentage of his yearly earnings based on the earnings of the company and his years of service with the company. At the end of a profitable year the employee's excess earnings are not distributed in cash but are paid by a certificate bearing 5 per cent interest. This certificate cannot be cashed until one year from the date of issue and upon two weeks' notice.

At the end of each calendar year, if a profit has been earned, the directors agree on an approximate amount to be used for profit-sharing. Each employee is paid a dividend on his year's salary, the dividend depending on the amount of the company's profit. In addition, he is paid an extra dividend for each year of service over one year and reaching a maximum at 11 years. For example, if a two-year employee has a salary of $2,400 and the profit sharing for that year is 10 per cent he gets $240 plus 5 per cent for two years' service, or a total of $252. If the same man has been with the company 11 years, he gets 50 per cent extra, or a total of $360.

This plan prevents the employee from indulging in a spree of immediate spending. It helps to hold the interest of the employee and, by deferring payment of cash to him, often leads him to buy company stock, which is offered from time to time on an advantageous basis. About 87 per cent of the employees now own stock in the company. All of the stock of the Ilg company is held by its employees. There have been only three years in the company's history when profits have not been shared.

The Welfare Club

As a further step in the promotion of employee interest and loyalty there was organized a committee which is composed of 16 department heads and foremen. This is termed the "Welfare Club." This committee has under its jurisdiction such matters as changes in rates of pay, plant shutdowns for recreational purposes, improvements in systems and routing, employee welfare and similar problems pertaining to company activities.

The Welfare Club is incorporated as a separate institution, which is or-

ganized into committees which have specific work to perform. There is, for instance, a committee which has the duty of investing funds, all of which are contributed by the company. There is also a loan committee, and another committee investigates each case of need, regardless of its character.

Club's Funds Used for Unemployment

The working capital in the hands of the Welfare Club was started as a pension and general welfare fund. However, the whole plan is so flexible that, when the business depression started and there was need for unemployment aid, the pension fund was thrown into the breach. In other words, this company was prepared to cross bridges when it came to them and that is still the policy.

It is a logical question to ask, "What now becomes of the pension plan?" The fact of the matter is that it is not in the discard for all time. Should the present fund be exhausted for unemployment relief, another so-called pension fund will be started as soon as the earnings of the company will permit. Furthermore, as matters now stand, the company is only 25 years old and the average age of its employees is about 38 years. Therefore it is reasonable to assume that the real need for a pension fund is about 20 years in the future. In the meantime an emergency exists and the company takes the liberal policy of offering its assistance at this time.

Money paid into the fund by the company is not counted as capital asset. It is in effect an extra resource which has been set up to meet new conditions which affect the welfare of its employees. The company employs 250 and it holds that it has an obligation to each one.

Only Earnings on Fund Used

A fund of this kind has very definite limitations as to its size, and for two and one-half years there has been no growth of principal. So far, only the earnings on the fund have been used, but there will be no hesitancy to cut into principal when occasion demands. When the entire fund is exhausted the work must end until business again warrants the accumulation of another sum as designated by the directors. It is significant that after two and one-half years the principal is still intact.

Cases of need are investigated by a loan committee upon whose recommendation an employee is lent money. In normal times loans must be secured by collateral, but under existing conditions they are made in worthy cases without collateral. In this case the recipient signs a note which creates an obligation to repay the Welfare Club. No interest is charged. This practice will result in some loss, but the company has found that lack of honesty has little to do with the

"A BUSINESS has three vital requirements: It must offer a worthy product, it must earn a satisfactory return on the capital invested in it, and it must provide a livelihood for its employees with reasonable opportunity for advancement.

"A profit-sharing plan should be adopted at the beginning of a business, because in that way it has the best chance of success.

"Perhaps the eventual development along this whole line is a company foundation, completely flexible, to be used for unemployment benefits, for pensions, for insurance or for any emergency."

J. M. Frank, President,
Ilg Electric Ventilating Co.

chances of repayment. The ability to repay is the foremost factor.

The Ilg company believes that it is to the best interest of the organization to hold together as large a force as possible. Therefore, its aim has been to lay off a minimum number of employees, which incidentally is an important factor in making the unemployment relief fund effective over a longer period. The workers who have been retained have been kept on full time and up to the end of 1930 there had been no general wage reduction.

Surplus Time Devoted to Research

With business comparatively slow, what work was there for the employees? It is recognized that the life of an industry depends on research. Usually the curve of research and development is inverse to the production curve. When production is at its height development is usually neglected. Therefore in this period of depression much effort has gone into development of new products and research.

This has, in effect, given the company an opportunity to do in one year, in the way of development, what it could not have done in three years when production was demanding major attention.

A plan incidental to the outline given above is to have the members of the Welfare Club take a three-day summer absence each year in addition to the regular vacation period. A three-day group outing is arranged so that the members of the club may become better acquainted. This idea also gives an opportunity to study how the subordinates left at the plant will carry on in the absence of their leaders.

The reason for this practice is that the future foremen and managers are today at the benches and machines. It is believed by the heads of the Ilg company that every position must be filled from below, and almost never is a man taken from the outside except to start at the bottom. With this plan, every employee tries to work himself out of his job and prepare for the job above. Bringing in an outsider and jumping him over the heads of others tends to undermine the morale of a group of employees. This, therefore, is another natural complement to profit sharing, unemployment relief and similar moves which tend to cement the working force of the company into a loyal and interested unit, ambitious for the company's success.

Wood-Coated Steel Sheets

METAL and wood, competitors for the favor of the buyer in many branches of industry, are today being combined in laminated materials. One of these combination products is Flexmetal, made by the Flexwood Co., 4413 West Division Street, Chicago. It consists of a No. 16 to No. 28 gage galvanized sheet to one side of which a wood veneer only 1/100 in. thick has been applied under pressure.

The new material is recommended by the maker for use in paneling Pullman and dining cars, elevators, flush-panel doors, radiator covers, flat and slightly curved surfaces of metal furniture, cabinets and partitions.

Sheets coated with wood veneer vary in dimensions with the sizes obtainable in thin slices of various woods. In most cases, lengths are about 96 in. and occasionally 120 in. Widths, however, are 30 to 36 in. in rotary cut walnut surfacing, 10 to 16 in. with sliced walnut, 8 to 12 in. for ribbon mahogany, an average of 15 in. with flat cut mahogany or prima vera, and 10 to 15 in. in flat cut oak.

Standard material is furnished with only one side of the galvanized sheets coated with wood veneer, but sheets are made to special order with veneer on two sides of galvanized or rustless steel, aluminum or any other metal. Metal may be furnished by the buyer. All sheets used must be specially stretched and leveled so that the veneer will adhere firmly and the panel, when in place, will not show irregularities of surface to mar the effectiveness of the wood.

Tests by the manufacturer indicate a firmly attached surface of wood on steel, which may be punched and drilled and will take ordinary curvatures, but cannot be bent at a sharp right angle without possibility of damage to the surface.

Nickel Steels Resist Embrittlement

By H. J. FRENCH and C. M. SCHWITTER

In charge of alloy steel and iron development, International Nickel Co., Inc., New York, and metallurgist, research laboratory, International Nickel Co., Inc., Bayonne, N. J., respectively.

SOME of the less generally recognized characteristics of low-carbon nickel alloy steels which make them valuable for use in boilers are discussed in this article. Increase in nickel content reduces aging embrittlement, as demonstrated by impact or slow bend tests on notched bars. It also reduces the grain size which can develop on recrystallization and raises the temperature at which strain markings of maximum intensity are observed in strain-etch tests, according to a research conducted under the direction of Mr. French, an authority in the alloy steel field.

NICKEL steels are widely used in locomotive boiler construction and, in the forms in which they are ordinarily applied, their tensile and impact properties are well known. However, they have other less generally recognized characteristics which make them valuable for use in boilers, and it is some of these which are discussed briefly in this paper.

Fabrication and Service Properties Important

In boiler construction the steel plates are subjected to "cold working"[1] in such operations as bending, flanging, punching, reaming, drilling, cutting or shearing, and this "cold working" provides conditions which permit the initiation of aging phenomena. Aging is accelerated by heating and, if high enough temperatures are reached, recrystallization can occur.

Aging and recrystallization are often accompanied by undesirable changes in properties and, therefore, the behavior of cold-worked steels with time—either at atmospheric or elevated temperatures—becomes an important consideration in the selection and fabrication of boiler plate.

German metallurgists pointed out many years ago[2] that the ordinary carbon steels were susceptible to undesirable aging effects and that the addition of nickel, of the order of 3 to 5 per cent, provided improved resistance to aging embrittlement.

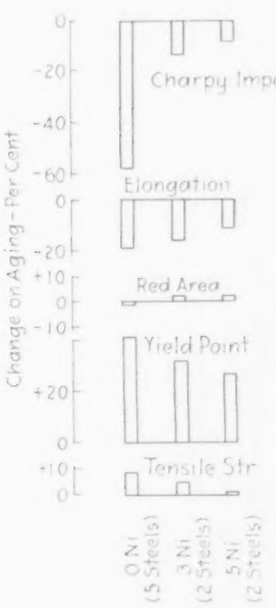


FIG. 1—Average changes in tensile and impact properties upon aging of low-carbon steels (0.05 to 0.12 per cent) for 270 days at ordinary temperatures. Based on data from Pomp—*Stahl und Eisen* 21, 681. Both "killed" and "rimming" carbon steels are included in the averages.

Aging phenomena are generally shown by an increase in the hardness or a decrease in the toughness of the steel, or both, and are also reflected in changes in the tensile properties and other characteristics of the metal. Probably the most generally accepted hypothesis to account for aging effects is that they result from the decay of an over-saturated solid solution initiated by the cold working process. If this hypothesis of dispersion hardening is accepted, it follows that aging phenomena can arise from a number of sources and, indeed, metallurgical literature supports this view.[3]

It has been pointed out by Koster,[4] who has given much study to aging phenomena, that the resistance of notched bars to impact is particularly sensitive to the dissemination of fine precipitates in steels and also that fine particle dissemination tends to shift the steep decline of the impact-temperature curve to higher temperatures. This shifting is, of course, influenced by the nature of the particles and the degree of dispersion, but can give low impact values in tests at atmospheric or slightly elevated temperatures. This undesirable condition can be counteracted by the effect which nickel has of lowering the temperature at which the steep decline in the impact-temperature curve occurs.

The effects observed after relative-

[1] In the sense in which this term is used it includes temperatures higher than atmospheric, up to and including "blue heat" in steels (about 550 deg. F.). In all probability it may properly be applied to all temperatures below recrystallization temperatures.

[2] P. Goerens: "Materials for the Construction of Boilers." *Zeit. Ver. deut. Ing.*, 68 (1924) 41.

[3] See, for example, W. Ellender and A. Wasmuth: "A Contribution to the Problem of Precipitation Hardening of Iron." *Archiv. f. d. Eisenhüttenwesen*, 3 (1930) page 659. *Metals and Alloys*, 1 No. 15 (Sept. 1930) page 732.

[4] W. Koster: "The Question of Aging on the Ground of Experience with Iron Alloys." *Zeit. f. Metallkunde*, 22 (1930) page 289.

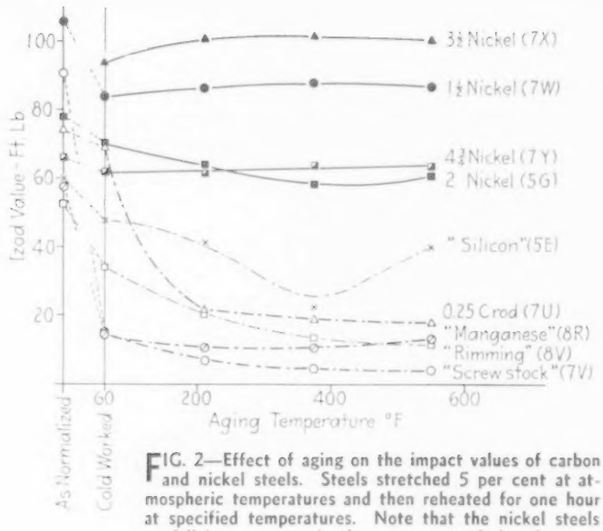


FIG. 2—Effect of aging on the impact values of carbon and nickel steels. Steels stretched 5 per cent at atmospheric temperatures and then reheated for one hour at specified temperatures. Note that the nickel steels fall in one group in the upper part of the chart.

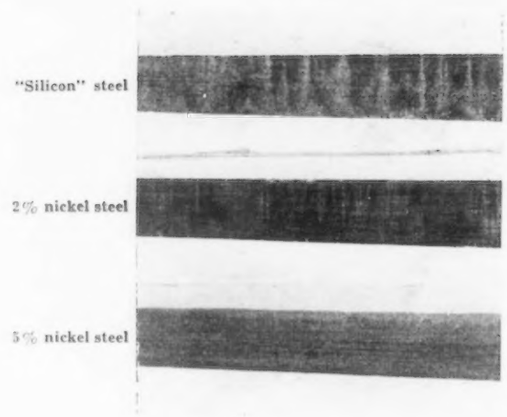


FIG. 3—Strain-etch figures in a "silicon" (killed) steel and two nickel steels. Note the decrease in intensity of strain-etch figures with increase in nickel content.

ly short periods of heating subsequent to cold work are known to reflect those observed over long periods at ordinary temperatures and are therefore of very general interest and importance. Fig. 1, assembled from comparatively recent tests,[5] illustrates the effects of prolonged aging at atmospheric temperatures upon the tensile and impact properties of both carbon and nickel steels and shows that the changes with time are smaller in the nickel steels than in the carbon steels.

The extent of aging is now most often judged by the decrease in notched-bar impact test values below those of the freshly cold-worked steel (unaged samples), but according to Fettweis[6] such tests, made only at atmospheric temperatures, tell only part of the story. They give no indication of the steep decline in the impact-temperature curve, a knowledge of which is often instructive and important. Furthermore, small test specimens have a smaller tendency than large ones to give brittle fractures and as a result the customary impact tests will often not show the true severity of embrittlement.

However, impact tests, especially when combined with slow bend tests on notched bars and strain etching, can indicate differences in susceptibility to embrittlement of different steels, have been widely used, and are made the basis of the discussion which follows:

Studies recently made of eight steels produced by American manufacturers serve to illustrate the effects of different nickel contents upon aging and recrystallization phenomena. The chemical compositions of the steels tested are given in Table I and particular attention is called to the "rimming" steel, 8V, the "killed" carbon steel, 5E, and the two per cent nickel steel, 5G, which were made at one plant and therefore are especially useful for direct comparisons.

Impact Tests on Notched Bars

Normalized bars from each of the steels in Table I were stretched 5 per cent over a gage length of 8 in. at room temperatures, reheated for one hour at selected temperatures, then notched as quickly as practicable after cooling, and tested. The results obtained are summarized graphically in Fig. 2.

The steels with about 1.50 per cent or more of nickel were free from aging embrittlement. In fact, with one exception, they suffered no losses in Izod impact test values at all, and in this one instance only a small decrease was observed, amounting to less than 13 per cent.

The five steels without nickel all showed aging embrittlement involving losses in Izod impact values of from 30 to 70 per cent. While the "manganese" steel of Table I did not show large decreases in Izod values when reheated following cold work, as did the other unalloyed steels, its impact values were very low and dropped markedly upon cold working, which suggests the probability of extremely rapid and severe aging. This view is supported by the fractures of the cold-worked and non-heated specimens, which were coarsely crystalline and shiny in appearance, indicative of brittleness.

It would appear from the tests cited that, while small percentages of nickel—around 1 to 2 per cent—will not necessarily insure against decreases in notch toughness upon aging, nickel tends to minimize such effects and in all cases eliminated aging embrittlement. This statement finds added support from the more extended studies of other investigators.[7, 8, 9, 10]

Slow Bend Tests on Notched Bars

Slow bend tests on notched specimens are probably a closer approximation to actual service conditions in boilers than are the impact tests. The two types of test will not necessarily show parallel effects and on this account slow bend tests were made on four of the steels listed in Table

[5] A. Pomp: "Researches on Boiler Plates." *Stahl und Eisen*, 21 (1928) page 681.

[6] F. Fettweis: "Notch Toughness." Materials Handbook of *Stahl und Eisen*, page D1, 1927.

[7] Charpy: *Compt. Rend.* 158 (1914) 311.

[8] Korber and Pomp: *Mitt.* Kaiser-Wilhelm Inst., Eisenforsch, Düsseldorf, 9 (1927) 339.

[9] Pomp and Bayer: Revisions—Ver. 33 (1929) 7, 26, 93.

[10] McKnight: *Trans.* A.S.S.T., Vol. 13 (1928) page 638.

Table I.—Compositions and Sources of the Steels Tested*

Steel or Trade Designation	Lot No.	Form Received	Manufacturer	Chemical Composition, Per Cent C	Mn	Si	P	S	Ni	Al
0.13% carbon "screw stock"	7V	1-in. cold drawn rds.	B	0.13	0.64	0.07	0.091	0.129	...	....
0.25% carbon	7U	1-in. hot rolled rds.	B	0.25	0.38	0.11	0.010	0.031	...	....
"Rimming"	8V	¾-in. plates	C	0.22	0.34	0.01	0.015	0.025	...	0.007
"Silicon"	5E	¾-in. plate	C	0.27	0.62	0.20	0.027	0.040	...	0.009
"Manganese"	8R	¾-in. plate	D	0.26	0.85	0.24	0.032	0.039	...	0.009
1½% nickel	7W	1-in. hot rolled rds.	E	0.16	0.44	0.22	0.010	0.029	1.44	0.009
2% nickel	5G	¾-in. plates	C	0.19	0.67	0.21	0.018	0.024	2.16	0.013
3½% nickel	7X	1-in. hot rolled rds.	F	0.15	0.52	0.26	....	....	3.46	0.008
4¾% nickel	7Y	1-in. hot rolled rds.	G	0.15	0.58	0.24	0.019	0.040	4.72	0.008

*Note that the trade designations used for steels 5E and 8R do not imply alloyed steels but completely killed carbon steels.

I. The results are summarized in Table II.

The 2 per cent nickel steel again showed better resistance to aging embrittlement than the three unalloyed steels, including one "rimming" steel and two "killed" steels. When it is recalled that the "silicon" steel and the 2 per cent nickel steel were made at one plant by comparable methods of manufacture, the effectiveness of nickel in reducing losses in ductility upon aging are quite striking.

Table II.—The Effect of One Hour's Aging at 375 deg. F. after 5 Per Cent Cold Stretching on the Slow Bend Properties of Notched Bars

Steel or Trade Designation	Aging Effect—Comparisons of Cold Stretched and "Aged" Conditions: Per Cent Increase in Prop. Limit	Per Cent Decrease in Deflection at Fracture
2% nickel	34	14
"Silicon"	36	41
"Manganese"	59	33
"Rimming"	50	37

Strain Etching

Strain etching is, perhaps, of interest chiefly because it may be indicative of the resistance to stress-corrosion. An example of strain etching in which comparisons are given of several steels, including the 2 per cent nickel steel and the "silicon" steel, both made by the same manufacturer, is given in Fig. 3.

Etching with the usual copper reagents did not seem to give wholly satisfactory results and the samples shown in Fig. 3 were etched with a solution recommended by d'Huart[1] consisting of a mixture of nickel and copper chlorides and chromic acid.

The 2 per cent nickel steel showed less marked evidence of strain markings than did the "silicon" steel, and when heated at 900 deg. F. subsequent to stretching the 5 per cent nickel steel showed no evidence at all of strain-etch markings.

Many other steels, in which samples were stretched and then heated at different temperatures, showed quite clearly a superiority for the steels containing nickel. A summary of some of these experiments is shown in Fig. 4, where the intensity of the strain-etch figures is plotted against the reheating (aging) temperature. The greater the nickel content, up to 5 per cent, the greater was the resistance to strain markings.

Grain Growth and Recrystallization

Recrystallization and grain growth in steels are dependent upon four major variables:

(1) Chemical composition of the steel.

(2) Methods of steel manufacture (obstructors of growth, sonims, etc., not only vary in character between "killed" and "rimming" steels, but from mill to mill in individual classes of steel).

(3) Conditions of fabrication (initial grain characteristics affect rates of growth; initial grain characteristics are not only dependent upon (2) but also upon finishing temperatures, manner of cooling, manner in which the grains are deformed in various parts of the section, etc.).

(4) Stress-temperature relations encountered in service.

In carrying out the tests which are summarized in Fig. 5, tensile test specimens of the usual dimensions (0.505-in. diam. by 2-in. gage lengths) were normalized and broken in the customary manner. The broken sections were split longitudinally and heated to the following temperatures: 1100, 1250, 1375, and 1500 deg. F. After polishing and etching the longitudinal face of each section, grain counts were made under the microscope at definitely known reductions in area along the length of each bar. The results obtained were calculated to average grain size in μ^2 (one μ or micron = 0.001 mm.) and plotted in the three-dimensional diagrams shown in Fig. 6.

These graphical representations show the relation, in perspective, between the average grain size, the deformation (expressed as the percentage reduction in area of the tensile test specimen) and the reheating (annealing) temperature for "killed" and "rimming" carbon steels of different carbon contents, and for "killed" nickel steels with different nickel contents.

For present purposes, it is only necessary to comment upon one or

(Concluded on advertising page 18)

[1] G. d'Huart: *Revue de Metallurgie*, June, 1929, pages 300 to 306.

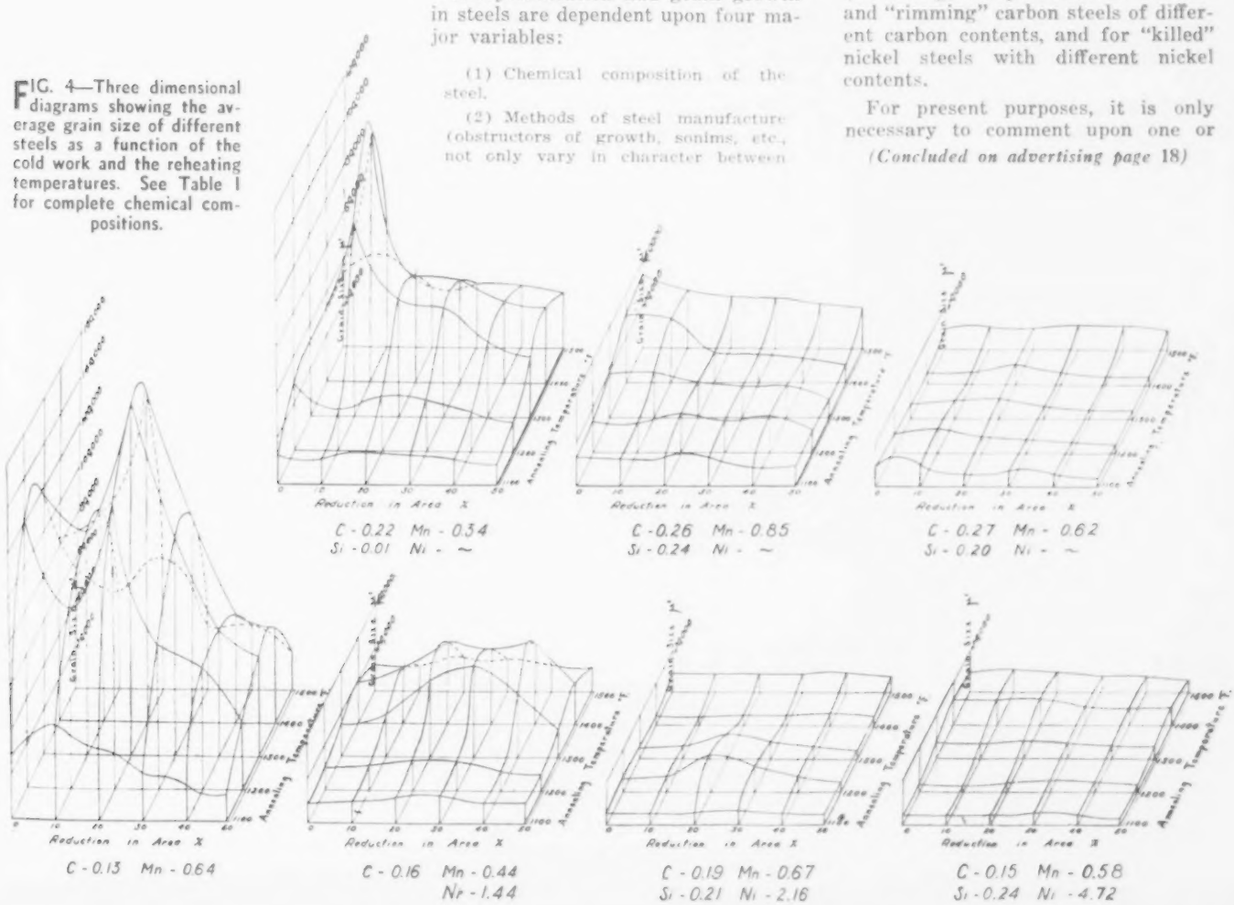


FIG. 4—Three dimensional diagrams showing the average grain size of different steels as a function of the cold work and the reheating temperatures. See Table I for complete chemical compositions.

The Finishing of Rolls by Grinding—II

By CARL MOREY
Consulting Engineer,
Big Rapids, Mich.

SINCE rolls in operation are usually arranged in groups of two with the work passing between them at the "bite," they are subject to deflection. This deflection is compensated by turning the roll bodies with a camber or crown, the amount of crown being equal to the deflection, so that the bite under full load is a straight line, as in Fig. 6.

In addition to the crowned roll there is what is known as the concave roll, Fig. 7, which is required for hot rolling. Since the expansion of the roll is much greater in the middle of the body than near the necks, it is necessary to form it concaved so that, when expanded, the bite will be a straight line.

Due to a lack of measuring instruments various rule-of-thumb methods were developed to gage this crown or concave. In the case of the concave roll two methods became universally used, one known as the roll cross, and the other, the straight-edge cross.

Fig. 8 shows application of the roll cross method. It will be noted that the gaging roll is perfectly straight, that a change in angle X between the axes of the rolls produces a change in magnitude of the concavity.

Fig. 9 shows a straight-edge cross. Again, a change in angle X between the straight-edge and the roll changes the magnitude of the concavity.

The mathematics of the concave curve are very complex, as the matter of thermal expansion requires concavity, while the deflection of the roll requires crown. The correct curve would be somewhere between these two, and is indeterminate, as there are variables involved. A change in temperature will disrupt any attempt at calculating the curve, and, as hot rolling allows for a wide variation of limits, it is not important to have the extreme accuracy required for crowned roll for paper, cold sheets, automobile body stock, etc. Therefore, any curve that is substantially harmonic is suitable, and gives good results.

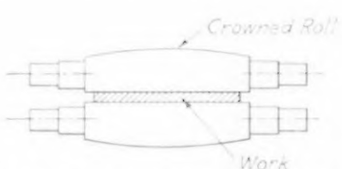


Fig. 6—Deflection of rolls is compensated for by turning the roll bodies with a camber or crown so that the bite under full load is a straight line.

Fig. 7—Rolls for hot work are formed concave so that when expanded, the bite will be a straight line.

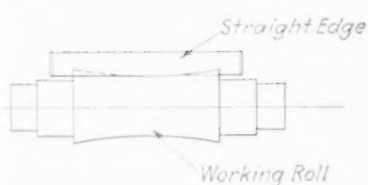


Fig. 9—Straight-edge cross method of gaging the magnitude of concavity.

To produce the crowned roll, a concave roll was first turned by either the straight-edge or the roll cross method. This roll was then used as a gage with its axis parallel with that of the roll to be crowned. The work was then turned to match the concave gage roll (Fig. 10).

No important attempt was made to crown or concave rolls by generating the curve, until the roll grinder was introduced. The matter of moving tools in or out against the cutting pressures was out of the question. But with the grinding wheel it was entirely different, as the feed-in pressure used only a small percentage of the power exerted tangentially in the cutting action of the wheel.

In addition to turning rolls with crowned and concave surfaces, another method was developed, namely, that of dressing the rolls in place by using emery cloth and a "V"-shaped piece of wood, which was passed across the bite of the rolls by hand. This method, shown in Fig. 11, is unimportant as the process was extremely slow, and results were far from satisfactory.

Roll grinders are highly specialized tools, yet each builder has brought out features which are characteristic.

It is hardly true to state that this or that type was the original, since several builders, both here and abroad, brought out machines simultaneously, and vastly different in basic design. While a history of these different machines is interesting as a study of tools, it will be considered only briefly, our discussion covering the accepted types in use today.

There are two general types, namely, the traversing-wheelbase type, and the traversing-work type. The traversing-wheelbase machines include both the single-wheel and the two-wheel arrangements. The traversing-work types use one wheel only.

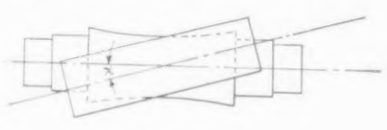
The drives for work-table or wheel-carriage include the screw, the horizontal rack and pinion, the "Sellers" drive (rack and worm), and the rotary hydraulic motor with rack and pinion.

Headstock drives use belts, chain, spur gears, double-helical gears, worm and wheel, and various combinations.

They are equipped both with and without footstocks.

Table and carriage ways are either "V", inverted "V", or "V" and flat.

Spindle bearings are ball, roller, bronze or babbitt.



Plan

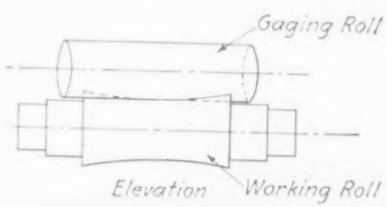


Fig. 8—Roll cross method of gaging the magnitude of concavity.

Wheel-drives are silent chain, flat belt, multiple "V" belt, or motor rotor mounted directly on spindle.

Wheels range in size from 12 in. to 36 in. diameter, and from ¾-in. to 8-in. face.

Headstock spindles are of both the "live" and "dead" type.

The several different builders differ somewhat in their idea as to what a roll grinder bed should be. On the traversing-wheelbase type there are four schemes: One consists of a single bed for both roll and carriage, one with two beds bolted together, one with an outside rail with bridges from the carriage bed to the rail for supporting neck rests, and one where the beds are separated and tied together with short cross members.

Crowning Attachment a Built-In Unit

Perhaps the most interesting and varied mechanism incorporated in the roll grinder is the so-called "crowning attachment." Considered an at-

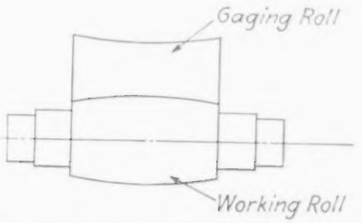


Fig. 10—To produce the crowned roll, a concave roll was used as a gage and the work turned to match the gage roll.

tachment on the early machines, it is today a fundamental part built into the machine. It can therefore be more properly called the "crowning mechanism." The function of this mechanism is to generate the crown or camber, and the concave curves of the roll body. There are about as many different types of crowning mechanisms as there are roll grinder designers, and they all produce more or less satisfactory results.

Early designers spent considerable effort in trying to duplicate the curves formed by the roll cross and the straight-edge cross. This, of course, led to trouble, as the roll and straight-edge crosses were not the ideal curves, and the mechanisms designed did not duplicate, so that the generated curves were less accurate than the thumb-rule method.

It has been stated that the curve of a crowned roll should be the elastic curve of the roll under a uniform load. Since this curve can be expressed only by an empirical formula, it follows that a mechanism designed to produce this curve in all its phases of roll length, amount of crown, and concavity would be extremely complicated and delicate of adjustment, as well as less rigid.

It was early found that to move the wheelbase on slides in and out the very small amount necessary to crown

CROWNING and concaving of plain rolls to compensate for deflection and for thermal expansion, respectively, and thus to assure a straight-line bite between the rolls and a more satisfactory rolled product, is discussed in this second article of the series. In roll turning, the roll cross and the straight-edge cross methods have been used; with the advent of the roll grinder generated curves were introduced. The first article appeared in THE IRON AGE of June 30, page 1388.

a roll by a screw was out of the question. The inaccuracy of the screw, lost motion, torsional deflection, etc., entered into designs and operation. So designers switched to the scheme of tilting the wheelbase, which was hinged either at the front (wheel-end), or rear. This permitted a favorable leverage ratio to be built into the wheelbase, thus allowing for longer movements of the mechanism, and adding materially to the ruggedness and accuracy of design.

Nature of the Crown Curve

Referring again to this crown curve, builders have differed widely in their ideas as to its nature. It has been variously called a parabola, arc of a circle, hyperbola, catenary, simple harmonic, sine curve, etc., etc. In comparing the mathematics, it is found that these various curves are represented by the following formulas, thus:

Circle $x^2+y^2=R^2$

Elliptic arc $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

Parabola $y=x^2$

Hyperbola $x^2-y^2=a^2$

Catenary $y=\frac{a}{2}\left(e^{\frac{x}{a}}+e^{-\frac{x}{a}}\right)$

Elastic curve $y=\frac{P}{EI}\cdot\frac{l^3}{24}\left[\frac{x}{l}-2\frac{x^3}{l^3}+\frac{x^4}{l^4}\right]$

However, some enterprising designer conceived the idea at an early date and built a machine using a deflected roll as a "former." He neglected to consider that the roll carried a uniform load, and placed one jack under the center of his "former" roll. This produced a curve which represented a concentrated load, which was incorrect.

Recognizing this defect, a "former" was built by the cut-and-try method.

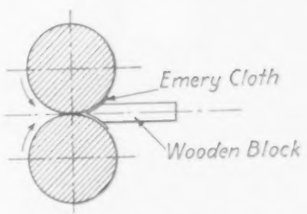


Fig. 11—Dressing rolls by means of emery cloth backed by a wooden block having a V-shaped end.

A roll was ground as accurately as possible in the machine, and was placed in a paper calender stack. Since the bottom and top rolls only have crown, this roll worked in conjunction with a dead-straight roll. The bite

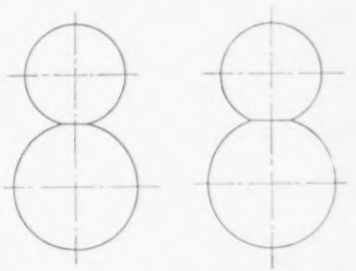


Fig. 12—In both pairs of rolls light is shut out, but the pressure between the rolls is different.

was then examined by the light test, and high spots were marked. The roll was then "touched up" in the grinder until it would "shut out light." The "former" was then cut to this curve. One point, however, was overlooked, and that is, the local deflection of the roll surface. With a load of possibly 100,000 lb. distributed over a length of 100 in., it gave a load of 1000 lb. per inch of length. It is apparent that, with an inaccurate bottom roll, the "surface" deflection may not be uniform. Fig. 12 shows two conditions that will shut out light, yet the pressure between the rolls is different.

Therefore, the light test is accurate only within certain limits, and "formers" developed on this basis may not be correct.

Careful investigation brought out the fact that other methods of crowning were as accurate, and much more compact and simple of adjustment than the "former" with its change gears, etc.

The "former" with a fixed curve (either convex or concave) then became a matter of history. It was followed by the simple crank motion, imparted by a crank in the case of one builder, and an eccentric by several others. A constant-curve cam was developed also with some success, as well as an "adjustable former." In addition to the above, a "sine bar" working in conjunction with a swivel table was developed, as well as the double eccentric, all of which attained commercial success.

· EMPOWERED · I · DRIVE · TRAFFIC

I · AM · TITAN ·

· I · am · Steel ·

· · · Buried · I · lie · until · called · to · be · servant · to · man. · · · Borne · to · a · city · of · industry, · fires · make · me · flow · into · many · forms · and · busy · shops · transform · me · for · a · world · of · work . · · I · am · cast, · rolled, · cut · into · a · myriad · tools · and · devices, · each · gifted · with · the · soul · of · a · craft. · · ·

· · · As · forge, · with · heart · of · fire, · I · defy · cold, · melt, · transmute, · refine . · · I · am Vulcan. · · As · motor, · alive · with · breath of · flame, · I · give · natures · force · to · man. I · am · Titan. · · · Empowered · I · drive · traffic · over · land, · sea, · and · air, · turn · the wheels · of · industry · in · field, · mine, · and factory. · · ·

· · · My · tools · cut · vast · timbers · into · useful · shapes, · bind · structures · to · shelter · mankind. · · · With · me · men · plow · and · plant, · garner · and · grind · to · feed · a · race, · and · women · cut · and · sew · to · clothe · the · world. · · · As · magnet · I · guide commerce · on · trackless · seas. · · I · become pen · and · press -- through · me · man's · thoughts · pass · to · the world · and · posterity. · · · I · am · hammer · and · anvil · of · the · race, and · forgings . · · · I · arm · states · with · ship, tank · and · gun; · raze · far · cities, · overturn · dynasties, bring · new · eras. · · I · become · bridge, · train, · vessel, · skyscraper. · · I · am · forged · into · factories, · spun · into · railroads, · woven · into · cities. · · ·

· · · I · make · man · strong · of · arm, -- ·

· I · AM · FORGED · INTO · FACTORIES . SPUN

Reproduced from THE IRON AGE of January 5, 1922, as an inspiration to those who

OVER · LAND , SEA · AND · AIR ·

Hercules; swift·of·foot--Atalanta; and·miracle·worker–Aladdin.··I scoop out·harbors,·span·rivers,·unite·oceans, move·mountains·and·toss·them·into the·sea.···

···My·arms–tireless,·strong,·skilled· beyond·dreaming–set·men·free.···

···My·power·to·serve·is·boundless, for·in·me·pulsates·cosmic·energy.···

···In·soldier·hands·I·carve·the·road· to·freedom;·with·the·surgeon·I·cut the·way·to·health,·with·the·work-er·I·build·civilizations.···

···Wise·artizans·endow·me·with· creative·power·in·automatic·machines in·which·age·old·crafts·made·per-fect··become·immortal.···

···I·take·man's·puny·crafts·one·by·one, make·them·all·vast·enterprises.···

···I·am·steel !···

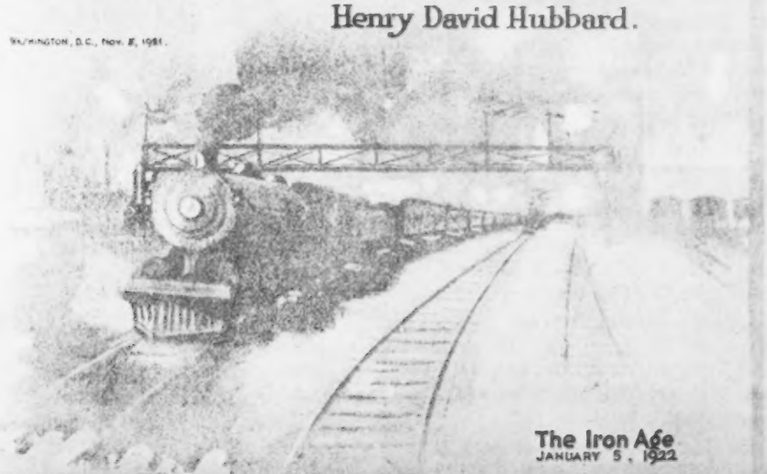
···Man·is·my·master.···

···I·am·his·master·servant.···

···I·await·his·command·to·create new·eras.····

Henry David Hubbard.

WASHINGTON, D.C., Nov. 8, 1921.



The Iron Age
JANUARY 5, 1922

I·AM·VULCAN·

INTO·RAILROADS, WOVEN·INTO·CITIES.

to those who refuse to despair and an encouragement to those who have lost hold of hope.

THE wire drawer (about 1350 A.D.) sits in a swinging seat and has a pair of tongs linked to his belt. He swings forward, grips the point, puts his feet up on the die and pushes himself away from it, getting about a foot of wire. ▲ ▲ ▲

Wire Drawing, Ten Centuries Ol

▲ ▲ ▲

HERE is history told in an unusually engaging manner. Mr. Lewis, who has been a diligent student of the developments in the wire industry, presented his first comprehensive writings on the subject to the Wire Association and the accompanying is based on that address.

Briefly, there are many gaps in the history of wire. The origin of the die cannot safely be dated within 400 years. There are scanty data regarding lubrication. The origin of the lime coat is wrapped in mystery. The day the first rods were drawn on a rotating block was a big one but it is not known within 50 years. The use of copper sulphate and wet drawing sprang up unnoticed by the historian. We have come far in 1000 years but we have still far to go, as Mr. Lewis pointed out in THE IRON AGE of April 7, in a notable contribution to the literature on the subject.

▼ ▼ ▼

IT is generally conceded by the few people who have dug into the history of wire drawing that pre-Christian wire was not drawn through dies. Such wire as has survived has been carefully examined and shows some traces of the manufacturing process. Some of it was sheared from plates and rounded by tapping with a hammer. Some was sheared from thin sheets and twisted; some was made by rolling up a scroll of thin sheet, pointing it down and pulling it through tapering holes in order to roll the scroll tight. In no case is there evidence of elongation by cold work, nor does such wire appear in lengths exceeding a few inches.

When long wires were required, short pieces were brazed or soldered together. I have examined many specimens of wire from Roman, Grecian and Egyptian tombs, without finding any ground for suspecting that a die was used in its preparation. Such wire was made of gold or silver and was purely an article of decoration with practically no commercial use. The records of trade and commerce of the Roman Empire have been searched and have yielded no reference to wire as an article of commerce.

The earliest known reference to the wire drawing die in literature is in a Latin manuscript written about the year 1000 A.D. in a German monastery. The writer, Theophilus, mentions dies as a part of the equipment of the usual metal working shop and describes them as being two or three fingers wide, rather thin and pierced with two or three rows of tapering holes. Since there is no description of a wire drawing process we can assume that it was a process well known among metal workers.

Dies have been found in deposits of tools and weapons dating to the time of the Vikings in Norway, apparently of about the years 700 to 800 A.D., and these dies are exactly as described in the manuscript referred to. A rough, crude die, made of an irregular lump of iron, has been found in France and is believed by some people to date back to the third century. It is certainly cruder than the dies found among the Viking tools or described in the manuscript of Theophilus, and since it is generally conceded that the arts were more highly developed in France than further north, there is some justification for the feeling that the crudeness of this die is the crudeness of great age.

There is the evidence. You can take it or leave it. Personally I am from Missouri. I find various bits of evidence in the Theophilus manuscript that lead me to believe that in the year 1000 the die was a rather recent invention.

At any rate the drawing of wire through the die was well established about the year 1000 and within the next 400 years we find pictures of wire drawing machines. The die, a perfect model of the English wire drawing plate of today, has three rows of holes and a handle. The handle is sunk into a sort of chopping block. The wire drawer sits in a swinging seat and has a pair of tongs linked to his belt. He swings forward, grips the point, puts his feet up on the die and pushes himself away from it, getting about a foot of wire. This is repeated as long as the rod lasts. The same process is done over and over with frequent annealings until the wire is small enough to go on to a spool which can be turned by hand. This particular picture dates about 1350, but this identical process was in use in Sweden and Russia in 1750.

A little later we find a refinement. The die is fixed on a sloping bed at the end of which is pivoted a bell crank, one end being a handle on which the wire drawer can throw his weight and the other end carrying linkage and tongs which the man opens and closes by hand at each stroke.

How Water Power Was Used

As a matter of fact, both of these wire drawing schemes were obsolete at the time the pictures were made. A certain German, Rudolph of Nuremberg, made an invention in 1350 and went in for wire drawing in a big way. His process was absolutely

es Old, Made Its Real Advances in Last Hundred Years

By KENNETH B. LEWIS
Morgan Construction Co., Worcester, Mass.

secret and the records of that time show that he made a great fortune. His competitors got hold of Rudolph's son and succeeded in bribing him so that he described to them the process which, as described in the Latin records of the town of Nuremberg, was: "The drawing of wire by the labor of wheels." And the son described how the tongs were actuated by cams on the shaft of a water wheel.

To illustrate how slowly progress was made in the early days of the industry, bear in mind this description of Rudolph's invention, at the same time looking at the third picture and reading a translation from the Latin of Eobanus Hessus. Rudolph's invention as in 1350. Hessus wrote in 1500 and the illustration before you was published in 1760 and represented the last word in wire drawing at that time. The description runs as follows:

"One can see how the work is done by the weight of the wheels and with what great power they stretch the iron and how they perform what 1000 men could not do before this art was discovered. A great wheel driven by the force of water, drives with itself a powerful shaft whose surface is armed with many teeth and when this shaft is turned by the water power, these teeth push and drag with them the parts of the machine which, although they resist, are unable to withstand the terrific force of the shaft, the wheel and the water. The dragons (tongs) seize with their sharp teeth the raw iron, and smooth it to round wire which is taken out of the dragon's mouth and coiled into a thousand convolutions."

This picture, as I say, was published in 1760 and shows the highest state of the art at that time. It corresponds exactly to the description by Hessus in 1500 and is the process described by Rudolph's son in 1350. Four hundred years has worked no change in wire mill equipment.

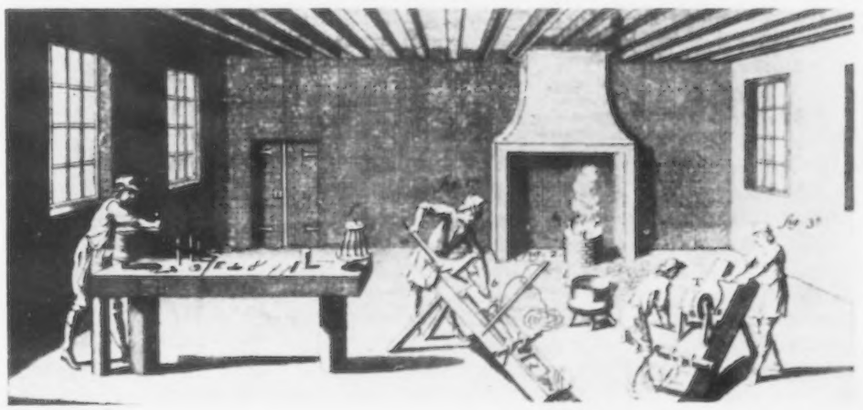
The years 1400 to 1500 were marked by one of the early industrial revolutions, the harnessing of water power to industry. The state of the art in Italy in 1540 is shown in an illustration reproduced from the book by Birringuccio. The shaft of his water wheel is a crank shaft and tongs are linked to the crank by a rope and belt. The operator sits in a swinging seat and rides back and forth with the tongs, closing and releasing them.

Lubrication Played Little Part in Early Days

The matter of coating and lubrication is of great interest. Very little is said about these functions in early accounts and there is ground for belief that they played little or no part in the process. Birringuccio refers to wax as a coating but seems to believe that it is used only to preserve a bright color on gold and brass wire. In the many illustrations of the fifteenth, sixteenth and seventeenth centuries, no lubricant is shown except that occasionally one can see a little bag of cloth or leather apparently threaded on to the wire and lying against the die. This doubtless held some kind of grease.

In 1750 one writer mentions that a greasy rag is placed near the die. We must of course bear in mind that coarse wire was in very short pieces, had extremely light drafts and was annealed after two or three reductions. It was also deeply scored every two or three inches with grip marks, and a few scratches would be of little consequence. We must remember, too, that coarse wire had no commercial value except as a raw material for fine wire. Still it seems safe to conclude that the various commentators and artists through whom we have our contact with the industry, overlooked this point and that there was some use of a lubricant.

As for a coating, we know pretty definitely that up to 1650 there was none. The rods, about ½ in. in diameter and 6 ft. long, were freed from scale by hand scouring with stone and sand. Annealed wire was cleaned



A REFINEMENT in wire drawing provided for fixing the die on a sloping bed at the end of which is pivoted a bell-crank, one end being a handle on which the wire drawer could throw his weight and the other carrying linkage and tongs which the man opens and closes by hand at each stroke.

A SHAFT "whose surface is armed with many teeth" is turned by water power and "these teeth push and drag with them the parts of the machine." The picture was first published in 1760, but describes a process developed in 1350, from which fact it is deduced that 400 years worked no change in wire mill equipment.

in the same way and went direct to the die in this condition.

Whole Family Contributed to High-Carbon Wire Advance

In 1650 a startling discovery was made and later recorded. It seems that while iron wire was being successfully drawn to fine gages and was being extensively used for wool cards, fish hooks and similar purposes, high carbon steel could not be reduced through the die. This was not from any lack of appreciation of what steel wire would be worth, for many attempts had been made to draw it. A wire drawer in Altena, disgusted after one of his unsuccessful efforts to draw steel, threw his steel out the window and it landed behind the privy. A few days later he picked it up and tried it again. It had been lying in a damp spot and it had taken on a brownish surface deposit, in other words, a sull coat. This he did not polish off and to his great surprise the steel went very nicely through the die. This was a big day for Altena. The art of drawing high carbon steel had been discovered.

For 100 years this secret was kept in the Altena district and all steel wire was coated in exactly the same way as the first sample. A writer of that time speaks of the wives and children of the wire drawers going to the mills at noon carrying yokes over their shoulders, from one end of which hung buckets of lunch and from the other buckets containing the family contribution to the art of sull coating. About 1750, after 100 years of experiment, it was found that dilute sour beer would produce a sull coat. After another hundred years, it was discovered that water would do it.

No other coating than the sull coat is mentioned in the records except for a suggestion by Rinmann in 1750 that the wire will draw better if soaked in lime water. I can find no further reference to lime, not even in a treatise written in 1830 which described the wire drawing process rather completely. In 1860, wire was being lime coated and baked in some parts of England. American mills were struggling with the lime coating during the 1880's and 1890's.

Lime Coating May Date Back to 1860

It is my understanding that the general use of the lime coat was preceded by the flour coat which some of you may remember. The flour coat was just going out when I first came into the wire mills twenty-five years ago. If anyone has any information on this point I hope he will get it on record before it is entirely forgotten. My guess is that the flour coat ran possibly from 1850 to 1890 and was overlapped by the lime coat which struggled in sometime between 1860 and 1880.

Lime Acts as Carrier of Lubricants

This history of coatings possibly throws some light on the nature of the lime coat and its reason for existence. I was told in my early days that the lime coat was used to neutralize acid. As a matter of fact, it is about the poorest neutralizer for sulphuric acid that could be imagined. Furthermore, it was used at a time when no sulphuric or other mineral acid was available so it could not have been taken up originally as a neutralizer. Of course it has no lubricating value of its own.

It has always been my idea that lime acts as a carrier for lubricants which are too soft to stand the enormous pressures in the bearing of the die. Just as a light oil is sometimes absorbed in a heavier oil to do a job which neither could do alone, so is lime used because it entraps in its rough, loose structure, the relatively soft grease or soap and holds it against the tendency to squirt back as it feels the pressure in the conical bearing. The sull coat probably acts in the same way. It bonds to the steel better than lime. The sull coat and the lime coat together probably make a thicker coating and carry in more lubricant than either could carry alone.

Mechanical Thrashing Succeeded Hand Scouring of Scale

The cleaning operation was purely mechanical up to sixty or seventy years ago. At first the bars were scrubbed with stone and wet sand. Later, beginning about 1730, mechanical thrashing came in, the power being supplied through water wheels. The tumbling barrel was in use as late as 1860 and was of course effective so long as bundles were small and there was little danger of tangling.

The organic acids were used to a small extent as early as 1750. Rinmann at that time reports that pyroligneous acid would remove scale but only after an immersion of from one to two months. In 1800 a light scale on annealed wire was removed by boiling the wire in tartar and the very fine scale resulting from annealing in sealed pots was pickled off in sour beer. These organic acids are not so bad. I found twenty-five years ago that a soaking of two or three days in rye meal liquor would soften up a fairly heavy annealing scale so that it would peel out of the die without doing any damage.

Early Uses of Sulphuric Acid

I cannot find any reference to the first use of mineral acids. Doubtless sulphuric acid was the first. It seems to have been used in a small way in preparing sheets for tinning as early as 1805, but there is no reference to its use in later descriptions of the wire making process. It seems reasonable to conclude that three factors operated to bring sulphuric acid into the wire mills. First, there must have been a demand for coarse wire as a finished product, free from the scratches which were tolerated in a semi-finished product and in longer pieces than had been previously worked. Second, there must have been a source of supply of rods in bundles too heavy for convenient handling in the tumbling barrel. Finally, there must have been a supply

of cheap acid available. These three factors probably came into play between 1845 and 1860.

The electric telegraph started a demand for long, coarse wires with as few splices as possible and of a decently uniform section. Rod mills in 1845 had worked up to 17-lb. bundles and were rolling rods ranging from ¼ to 9/32 in. In fact, one mill was doing No. 5½ gage. Finally, the great mines of Nevada were beginning in the 1850's to ship sulphide ores to the East and to Europe for refining and it can be supposed that sulphuric acid as a by-product began to look around for a market.

Annealing has never made much progress. Open fire annealing was of course the earliest practice, but the use of pots came in rather early, especially for fine wires.

Early Drafting Practice Obscure

Drafting practice is naturally a subject on which early records are very obscure. There were apparently no gages. Since there were no automatic machines requiring accurately drawn wire, wire was ordered by name rather than by size. I am referring of course to fine wire since coarse wire was only a semi-product. The coarse wire had no size. It was so distorted by grip marks that scratches were probably never noticed. It is interesting to speculate on this non-use of coarse wire. Was there no field for it because it was of such a rough character or was it rough and scratched because there was no demand for it as a finished product?

There are a few bits of evidence in the records regarding drafting practice. In 1750 wire reaching No. 7 gage had had from 20 to 25 drafts and three annealings and the loss was already 25 per cent. In 1800 wire at No. 20 gage had had 40 drafts and six annealings. In 1828 fine wire, size not specified, had had 35 to 40 drafts and four to five annealings. It is easy to deduce that not only were the dies improving, but the raw material.

How Dies Were Made

Dies are not discussed in the early records. Doubtless everything pertaining to dies was a deep secret. About 100 years ago, we find the first description of the die making process. These were the composition dies with soft backs and hard faces, characteristic of European practice until quite recently, and in fact still to be found in large numbers. The hard material was prepared by breaking up thin cast iron pots and refining these fragments by repeated melting in a charcoal fire. After each melting, the pieces were again cracked up.

After ten or twelve re-melts, we can imagine that the carbon had dropped to 2 or 2½ per cent and that the silicon was pretty well gone. This material must have been on the border line between white cast iron and tool steel, with the carbon probably all in the combined form. At this stage a soft iron backing plate was prepared by deeply scoring one of its faces. The refined pot fragments were cracked up as small as possible and spread over this scored surface, being held in place by a wrapping of cheesecloth and then by a thick coating of wet fireclay. This composition was then heated to a high temperature so that the pot metal became pasty while the wrought iron plate still held its shape. The plate was then very carefully and lightly hammered, reheated, hammered again and this heating and hammering repeated until the high carbon material had bonded with the wrought iron. The plate was then pricked for a very large number of holes, sometimes as many as 300, all of different sizes, so that a man could draw the entire range of his work in the same plate.

ABOUT the time of the early settlement of America, fine wire was drawn on blocks, one block per man, and the block turned by hand crank mounted either on the edge of the block or on the top of its spindle.

Drafting was, as indicated above, extremely light. It had to be light since the raw material was rotten and so were the dies, while coating and lubrication were of the most rudimentary character. A reduction of 0.010 in. in coarse wire was considered very daring in 1828. One hundred years later we take off 0.060 to 0.070 in.

Early Wire Workers Substantially Slaves

To sum up a historical sketch of the wire industry is a very tricky piece of work. News travelled very slowly in the early days, especially news of industrial practice. The early wire workers were practically in slavery to the local barons and dukes who naturally got a good revenue from taxing their product and who often forbade the skilled operators to leave their district. Practices varied immensely from country to country and from district to district. Old practices existed for centuries side by side with new practices. Still it is necessary to put together some sort of moving picture of the wire industry.

We may picture it from, say, 1000 to 1400 A.D. working from the crud-

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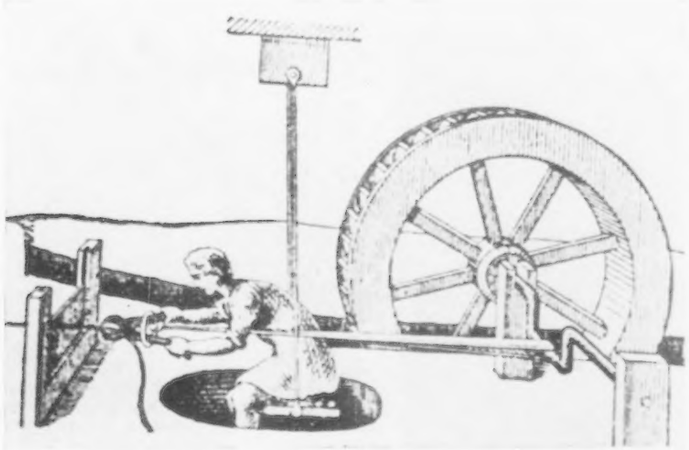
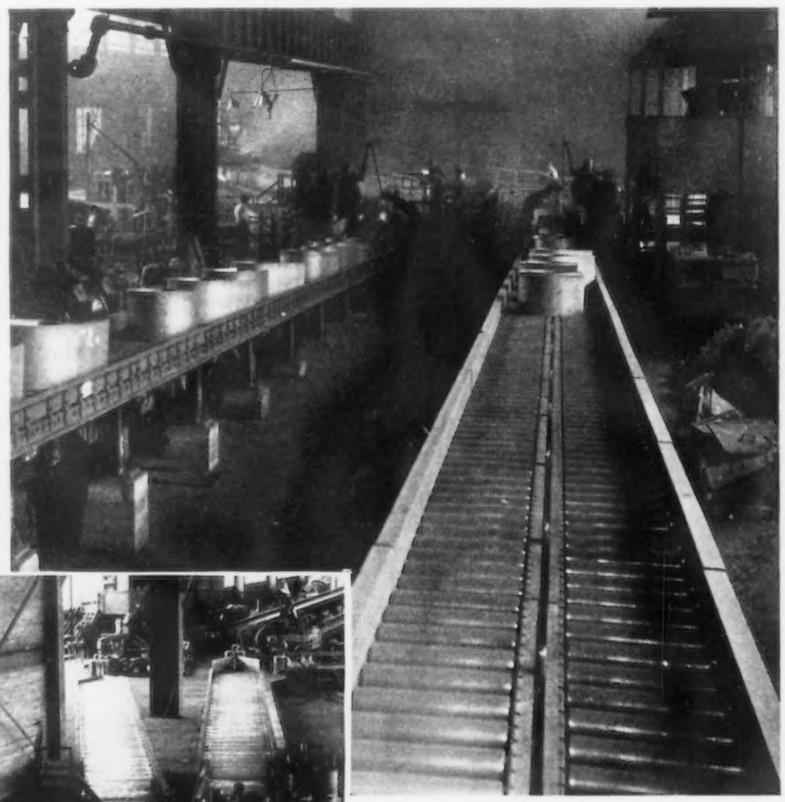


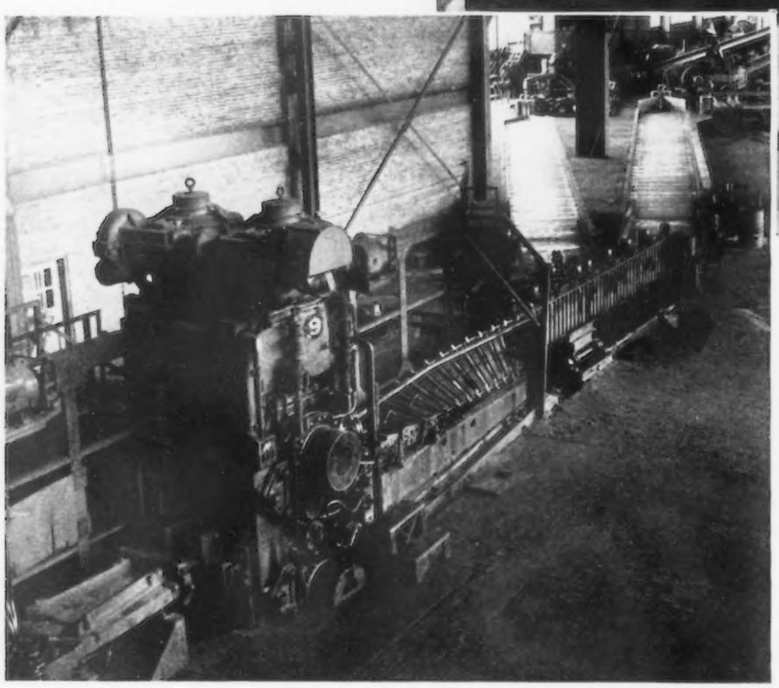
IN Italy in 1540 the shaft of the water wheel is a crankshaft, and tongs are linked to the crank by a rope and belt. The operator sits in a swinging seat and rides back and forth with the tongs, closing and releasing them.

Scratching Eliminated by Unusual Equipment in Hot Strip Mill

SURFACE scratching of hot-rolled strip in the coiling operation has been practically eliminated at the new continuous mill of the Sharon Steel Hoop Co., at Sharon, Pa., by means of an unusual conveying system developed by the Mathews Conveyor Co., Ellwood City, Pa. Rigid requirements on the part of consumers of strip steel have made surface regularity of great importance to strip makers, and the problem has been solved by applying Mathews rollers to guide the steel from the last roll, where the strip is in a horizontal position, to a conveyor which carries it to the coiler in a vertical position. The trough to guide the steel consists of two sections of roller conveyor with an opening of ⅝ in. between rollers. The rollers, made of 3⅝ in. diameter seamless tubing, are hardened and ground and mounted on Mathews ball bearings equipped with grease fittings for pressure lubrication. The rollers are spaced on 6 in. centers and between them are hardened and polished plates to prevent the strip steel from getting out of the trough. These plates were machined and fitted in such a way as to give a minimum of clearance between the rollers, and were set slightly below the contour of the rollers to insure the strip touching them and not the plates. They are mounted both horizontally and vertically and serve their purpose equally well in both positions under severe service, such as intense heat, excessive speed and water and steam conditions.

The high speed at which the strip is traveling when it leaves the last mill, along with the high temperature at which it is delivered to the trough, necessitated accurate workmanship if warping of the trough was to be avoided. This was accomplished by making the frame of heavy construction and reinforcing guide plates with heavy ribs. As the rollers are pressure lubricated, the entire trough is equipped with a water spray in order





ROLLER bed chain conveyors (above) move the hot coiled strip to a tying platform. This roller bed replaces a cast iron bed, and eliminates damage to the edges of the coils.

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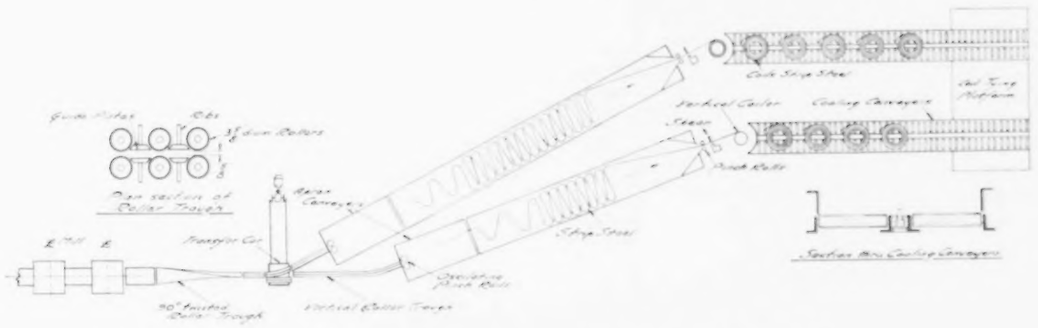
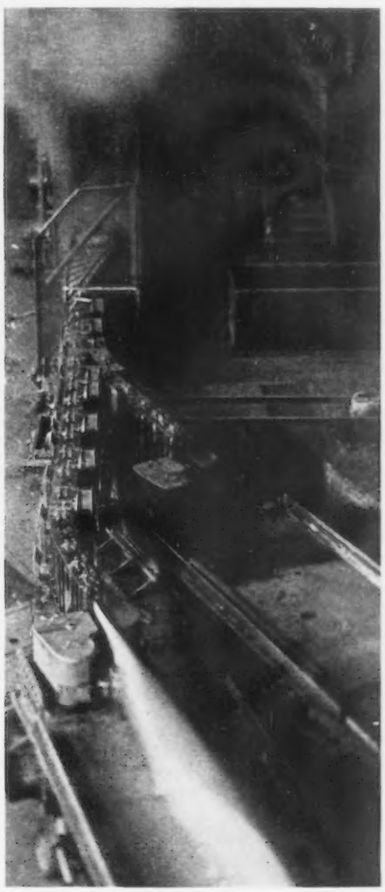
THE twisted trough where the strip steel is twisted 90 deg. from a horizontal to a vertical position is shown in the foreground of this picture. A short distance from the delivery end of the trough a mechanically operated transfer car is used to guide the strips to either of two vertical coilers, which are visible at the ends of the twin delivery tables.



Layout, showing method of delivery of strip to coilers after a 90 deg. twist.

to prevent the grease from running out of the bearings because of the high temperature. One half the trough is hinged, and can be opened quickly to remove a cobble if necessary.

Roller bed chain conveyors are used to carry the hot coiled strip from the vertical coilers to the tying platform, from which point they are transferred by crane and magnet to the warehouse. The roller bed replaces a cast iron bed formerly used, thus eliminating possibility of damage to the edges of the strip, which was encountered in the cast iron installation. The new roller bed consists of two parallel lines of heavy duty roller conveyors, the rollers being 20 in. long, spaced on 10-in. centers, staggered, and equipped with Mathews Nitralloy heat-resisting ball bearings. A drag chain is mounted between the roller lines, having pusher lugs fastened to the links at intervals to advance the coils. This type of conveyor also reduces the power required to move the coils to a minimum.



STRIP steel is delivered from the mill at a temperature of approximately 1625 deg. Fahr., and at the rate of 600 to 1200 ft. per min. The rugged construction of the roller trough is shown very clearly.

"Pathways Back to Prosperity"

ANY book bearing out the above title to the extent of revealing workable cures for our present economic sicknesses could be well assured of a wide reading. Charles Whiting Baker, who for many years edited the *Engineering News*, bringing it to a place of large influence in the field of civil engineering, is the author of the volume before us* which brings to bear on the baffling problems of this present time the results of his experience as an engineer, economist and editor. There are 21 chapters, but only two are devoted to telling how prosperity can be regained, and in one of these, the longer, called "Advice from Mars," the remedies are put in the mouth of a visitor from our celestial neighbor, presumably a Martian economist.

Perhaps the disparity between the number of pages the author gives to ways and means of restoring prosperity and the more than 90 per cent which discuss the causes of the depression should not surprise us. With most of us there is probably an even wider gap between what we know of what brought ill fortune to the American people in the past two years and of what ought to be done about it.

Much of the ground covered in the 19 chapters is very familiar, and the story of our growth in wealth and of the amazingly rapid changes in our life takes a wide range. This depression, we are told, is not merely cyclical. The prime factor, as Mr. Baker sees it, is the ending of the construction era of the industrial revolution, bringing to a standstill industries dependent on construction. Price reductions through large outputs of machines do not increase consumption in the old way. Also, distribution cost is too high. The great gap which our social mechanism has developed between the producer and the consumer must be bridged. (Yet, such is the flexibility of all economic statements, that on another page we are told, "Of course, this business of selling gives employment to an enormous number of people and helps to furnish jobs to offset the small amount of labor in production.")

Our enormous surplus of farm products and the transfer of millions of people from farms to cities are charged to the machine. The burdens of city life are painted in vivid colors, and we are told that "there is today a larger percentage of able, experienced business men and professional men in the ranks of the unemployed than of wage-earners." A movement back to the land is urged. (Yet that would aggravate the farmers' plight). Much stress is put on a return to simpler living. Shorter and fewer work-days are urged. And so on, with many references to the effects of the tariff, our banking practice, the

(Concluded on advertising page 14)

*Pathways Back to Prosperity. By Charles Whiting Baker. Pages, XIX + 351, 5½ x 8¼ in. Funk & Wagnalls Co., New York, 1932.

MONEY SAVING IDEAS

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Welds with Less Acetylene

THE adjustment of the gas and oxygen supply for welding is often a matter of temperament because so many of the conditions are subject to variation. If a welder holds the torch close to the work he may successfully use one adjustment between the gases, whereas another welder, who holds the torch further from the work, may operate successfully with a different gas adjustment. One manufacturer has found success in non-ferrous welding by reducing his supply of acetylene. He says that by gradually closing the acetylene valve, the flame first shortens and then lengthens and as it lengthens it loses much of its luminosity. In this condition and with the tip of the cone held close to the work he secures a neutral atmosphere for welding extruded metal.

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Corrects Method of Tool Grinding

MAINTENANCE of tools and equipment is even more important under reduced output than it was with capacity operation because an improperly adjusted tool is an extravagance. An automobile parts manufacturer appreciating this fact has adopted a rigid system of shop maintenance. Each night he has machinists check the cutting angles of tools, the method of grinding cutting tools and the freedom of vibration of machine tools. Daily reports are made out and from these the foreman is able to correct operating inefficiencies.

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Cleaning Strip by Abrasive Blasting

THE selection of pickling or sand blasting as a means of cleaning steel must be determined by the nature of the work and of subsequent processes. One manufacturer who found that surface requirements permitted the use of an abrasive blast has made an appreciable saving in his cleaning cost by installing a continuous blast operation on strip steel. The strip is conveyed through the blast zone on conveyors so arranged that abrasive blasts impinge on both sides. It emerges from the zone fully cleaned and ready for the next operation. This same company has devised some continuous blasting operations for small parts, but these are more difficult to arrange, and for such work most manufacturers have turned to the combination of tumbling barrel and sand blast or to pickling.

NEW WRINKLES

A dozen non-competitive manufacturers in Massachusetts have formed a group with open house visiting privileges in the hope that new wrinkles—new economies—developed at one plant may be used to advantage in another. In a similar way this page is offered every other week in THE IRON AGE in the hope that it will benefit some manufacturers by presenting the new wrinkles of others. Your comments and the account of some of your own new wrinkles are invited. Please address Forum Editor, Iron Age Publishing Co., 239 West 39th Street, New York.

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Vacuum Cups Handle Sheets

IN a stamping plant one of the most familiar operations involves the picking up of a steel sheet from the top of a pile. This is usually a hand operation, the operator using gloves and becoming expert at catching hold of the top sheet in order to separate it from the others. Many different devices have been tried to facilitate this operation. One of the best of these for light sheets is the use of a small rubber vacuum cup. One manufacturer has had special cups made up for this purpose with a short stout handle attached following the design of the old-fashioned school bell. This cup with its handle is fastened with a long spring from overhead so that it normally hangs about 3 in. in from one corner of the pile of sheets. The operator merely brings this cup into place on the sheet and with it lifts the corner of the top sheet an inch or two permitting him to take hold with his other hand. He then lets go of the cup and is free to use both hands to place the sheet in the press. Another manufacturer uses a vacuum cup fastened at right angles at the end of a small foot-long handle.

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Punch Press Feeds Magazines

THE handling of small punchings from a punch press to the succeeding operation is often expensive. If the pieces are carried in bulk they must either be hand fed to the next operation or an automatic hopper feed device, usually of a complicated nature, must be inserted as a separate operation. A manufacturer of roller chain has overcome this difficulty and increased production by having the operation of the punch press force the pieces successively into long magazine holders which are then removed and carried to the succeeding operation where they are attached ready for the automatic feed of that machine.

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Electric Lights for Testing

A MANUFACTURER of bearings has introduced a system of electric lights to replace the usual dial of a micrometer testing device. The part to be tested is placed on a steel table and a pointer from a micrometer instrument is brought down in contact with its upper surface. If the dimension is within the prescribed limits an amber light appears and the part is pushed on to a conveyor for transfer to the assembly department. If the part is under-sized, a red light appears which is a signal to place the part in a tote box for transfer to a reclaiming department. If the dimension is over-sized a green light appears and the part is then returned for further machining. Greater accuracy, higher production and less eye strain for the inspector are reported for this system.

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Railroad Siding for Truck Delivery

REDUCED operations and the greater flexibility provided by small deliveries have caused many plants to shift to trucks for both incoming and outgoing material. Many of these, originally laid out with a railroad siding extending along the shipping and receiving platform, have found it awkward to adjust to truck delivery without abandoning the facilities provided by the siding platforms. One manufacturer with an outlying plant provided with excellent freight delivery facilities but inadequate arrangements for truck delivery has changed his siding to a truck roadway by clamping cross pieces on to the rails and then raising the level of the roadway by means of old ties taken from another unused siding. The result is a truck passageway along his shipping and receiving platform which brings the bed of the truck at the level of the platform.

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Jig Used for Multiple Milling

A MANUFACTURER of valve parts has increased the production of a standard milling machine by extending the cutter arbor to provide for 6 or 8 cutters and then devising a rigid jig to hold in position 6 or 8 of the pieces to be milled. The jigs have a wide solid base which is quickly clamped to the table of the machine. A marked saving in set-up time and some saving in actual machining time is reported for this device.

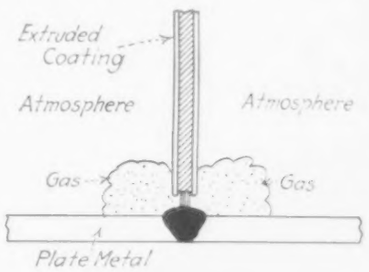
Dust Separators Operating at 250-lb. Pressure Fabricated by Welding

By E. W. P. SMITH
Consulting Engineer, Lincoln Electric Co.,
Cleveland

DEVELOPMENT of the "shielded arc" welding process, in which a gas envelopes the weld and shields it from the oxygen of the atmosphere, is the result of study of phenomena within the arc. Increase in speed of welding, from two to four times the speed obtainable with bare or ordinary coated welding rods, is an advantage of the shielded arc, while of outstanding importance is the fact that the physical characteristics of the weld are superior to those of mild steel. The process is thus well adapted for use in the construction of pressure vessels designed to conform to code and insurance requirements. Chemists and metallurgists have long known that inferior welds were caused by poor fusion and the inclusion of oxides and nitrides in weld metal. They know that steel in its molten state in the arc has a great affinity for oxygen and nitrogen in the atmosphere.

Poor fusion can be corrected by increased welding heat and more careful application of the process. Oxides and nitrides can be excluded by shielding the arc. With manual welding this desirable protection is obtainable by the use of a heavily coated electrode, such as that shown in Fig. 1, which has a coating of special composition and is made to rigid specifications. In the arc this coating burns less rapidly than the electrode melts, forming in effect a crucible around the arc, protecting it for almost its entire length. As this coating burns it gives off carbon monoxide, one of the best deoxidizing gases known.

Two functions are performed by this gas. First, it forms a protective envelope around the arc, as shown;



furthermore this deoxidizing gas actually improves the quality of the steel by reducing any oxide contained in the steel adjacent to the weld. Pure weld metal made by this process shows better physical qualities than either the electrode metal or the base metal.

The residue from the coating forms an easily removable slag which protects the deposited metal upon cooling. This process, being used at high welding heat, insures proper fusion and makes possible increased welding speeds. Tensile strength ranging from 65,000 to 85,000 lb. per sq. in., depending upon the carbon content of the plate, is obtainable, and ductility tests show better than 18 per cent elongation in 2 in. of metal. Furthermore, the resistance to corrosion is better than that of mild steel.

The shielded arc process has been used for more than 500,000 field joints on pipe lines, tanks, barges and other units where strength and speed of construction were major objectives. The Ohio Machine & Boiler Co.,

(Concluded on advertising page 18)

(Above).—In the "shielded" arc welding process a gas envelopes the weld and shields it from the oxygen of the atmosphere.

(Below).—Six of these dust separators, each of which measure 4 ft. in diameter and 20 ft. in length, were shielded arc welded, including the baffles and interior fittings. They are made of 7/8-in. plate and are designed to operate at 250 lb. pressure.

(At Right).—Elliptical heads 1 1/8 in. thick are used in these dust separators. This view shows the appearance of the weld, as well as that of the edges of the plate.

Boiler Tube Holes Drilled on Special Hydraulic Machine

FOR drilling the tube holes in large express-type boiler drums the National Automatic Tool Co., Richmond, Ind., has recently furnished a special hydraulic vertical drilling machine that is an adaptation of the standard Natco model D20H driller and is equipped with a semi-automatic Oilgear feed arranged with the company's patented safety foot control and emergency reverse. Drilling of 12 1½-in. holes in steel at a heavy feed is within the capacity of the machine.

The 24 x 40-in. rectangular head employed is bored for 16 spindles and is equipped with 12 3-in. diameter upper-joint assemblies, each of which has a single speed and a neutral position. Roller bearings are used throughout the head. Spindle equipment consists of a special adjustable bearing plate arranged with 12 2⅝-in. spindles having No. 4 Morse taper and nose adjustment. The spindles are held in a straight line parallel to the column ways; they have horizontal adjustment of 14-in. to and away from the column, the minimum and maximum distance being 22 and 36-in. respectively.

Of special construction, the base is provided with two rectangular slots extending from left to right, which are of proper depth to receive a 75-lb. rail. These slots are spaced to permit 36-in. center-to-center distance of the rails under the center of the head. The base is surrounded on three sides by coolant channels. The coolant reservoir is contained within the base, and the coolant pump, driven by independent motor, is mounted on the rear of the column. The coolant shut-off valve is turned on automatically with the downward movement of the head. Mounted on the base between the two large slots is an air-operated jack for supporting the large steel drums while being drilled.

The machine is approximately 16 ft. high, and weighs about 38,000 lb.

Announces New Model Carbo-Lathe

A NEW model Carbo-Lathe, the second series, that incorporates a number of improvements, has been announced by the Porter-Cable Machine Co., Syracuse, N. Y.

Bed and headstock have been strengthened by better ribbing, thicker walls and larger fillets. The weight has been increased about 100 lb. Chrome nickel iron, having high tensile strength and long wearing qualities, is now used. The bed is constructed so that chips fall through the center, and the shears are of dovetail type with large bearing surface on the top.

Both front and rear bed ways are identical, a feature emphasized as permitting unique set-ups. Two carriages can be used at once, one on front and one on rear, for rough and finish turning; or one regular carriage and one taper attachment carriage for turning straight and tapers simultaneously. Other combinations are two facing attachments, one for straight facing and one for angular facing; or any one of these attachments in combination with the other.

A new and heavier tailstock of two-piece construction is used. The two units are held rigidly together by a 2 in. wide alining key and four large cap screws. An adjusting screw is provided at the back for getting the proper alinement between centers. The tailstock is bolted to the back bed ways by two large draw bolts.

Drive is from a motor in the base to single-plate dry disk clutch which also carries a brake for quick stopping of the spindle. If desired, the lathe can be driven from a countershaft by removing two small covers from the top of the clutch guard, allowing the belt to pass through the guard directly on to the clutch pulley. The drive continues through pick-off gears at the front of the lathe to a worm and worm gear which drives the spindle. Spindle pick-off gears have been widened to 1¾ in., increasing their strength some 40 per cent. The worm gear drive now comes in two ratios—the low gear with a ratio of 3½ to 1 and the high gear with a 2 to 1 ratio.

Spindle speeds obtainable with an 1800-r.p.m. motor and low geared head are 95 to 1130, with feeds of 0.005, 0.010, 0.015, 0.020, 0.025 and 0.030 in., and with high geared head 170 to 2000 r.p.m., with feeds ranging from 0.003 to 0.025 in. Variable-speed motors can also be used to get even a wider range of spindle speeds.

The lathe will turn work up to 7

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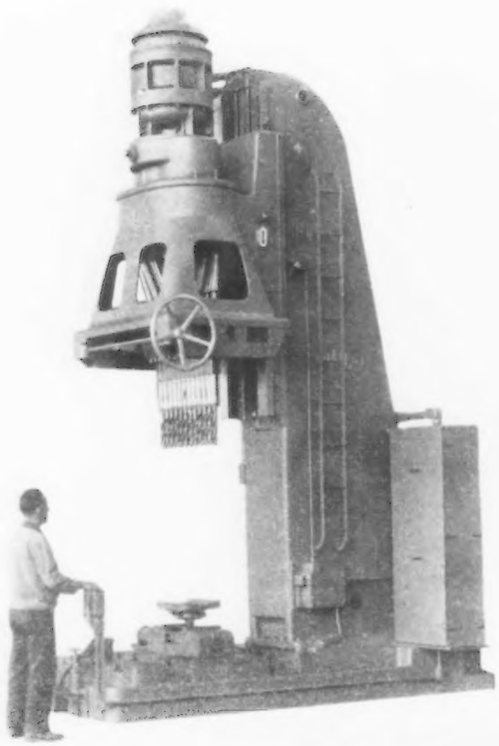
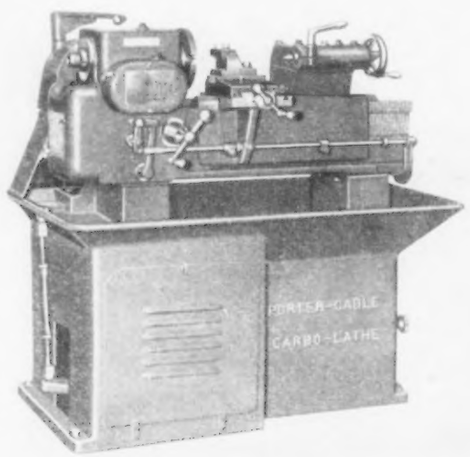
(At left) This tube hole driller has capacity for drilling 12 1½-in. holes at heavy feed.

(Below) Heavier and stronger bed and other parts feature this improved lathe.





in. in diameter x 18 in. long, and for short chucking work will handle pieces up to 12 in. in diameter.

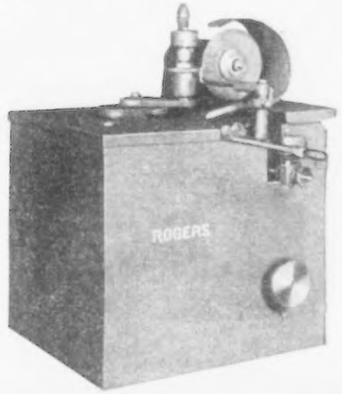
A positive stop on the carriage cross-slide provides for setting the turning tools to turn the proper diameters. Stops are provided on the longitudinal feed lever so that all feeds trip automatically at the end of the cut. The base is larger and heavier and has a much larger chip pan. The weight of the entire machine has been increased about 250 lb. The principal attachments have also been redesigned for greater strength and improved operation.

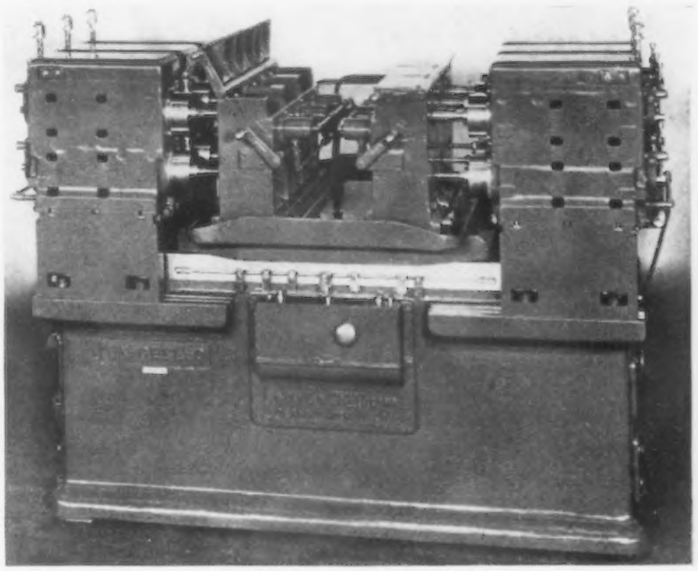
Sharpens Metal-Cutting Saws Automatically

SAWS ranging from 2 to 16 in. in diameter may be reconditioned automatically on the bench type milling, or slitting, saw sharpener built by Samuel C. Rogers & Co., 193 Dutton Avenue, Buffalo. This machine is equipped with an index or ratchet feed plate, and it is stated that worn or damaged saws can be sharpened or recut with teeth of any desired shape and with exact spacing, regardless of the condition of the teeth. The index plate makes possible automatic shaping and spacing of the teeth of saws as small as 2 in. in diameter.

All working parts, with the exception of the grinding head and feed lever, are entirely inclosed within the machine, and are thus protected from dust and dirt. The grinding arbor is mounted in SKF ball bearings. Principal moving parts are provided with ample adjustment for taking up wear, and all adjustments are accessible. Convenient handwheel adjustments facilitate obtaining any standard shape or spacing of teeth.

Regular equipment includes a 6-in. grinding wheel, a tooth former, and an index plate and cone to accommodate usual sizes of saw arbor holes. The machine, designated as the No. 4MS, can be furnished with tight and loose pulleys for belt drive or with motor and lamp or power line socket connection. It occupies space of 20 x 22 in. and is 28 in. high. The shipping weight is 250 lb.





Improved Precision Boring Machine

THE improved precision boring machine brought out recently by the Ex-Cell-O Aircraft & Tool Corpn., 1200 Oakman Boulevard, Detroit, under the designation of the No. 216A, supersedes the model No. 216 described at length in THE IRON AGE of Nov. 13, 1930.

A straight-line effect has been carried out on the entire machine. A pedestal foot type of base has been adopted so that no chips, dirt or water can collect around the bottom of the base and be held on the base proper. The overall height of the machine has been reduced 5 in., bringing the center distance of the individual boring units to 42 in. above the floor line and making it easier for the operator to load and unload the holding fixture while in production. The overall length of the base has been increased 4 in. and is now 74 in. long.

The table supporting the holding fixture has a vee and flat way, each of which are provided with forced feed lubrication. Mounting of the bridges on the base has also been changed, both surfaces which fit on the base now being flat, instead of the flat and the V-shaped surface formerly used. A T-slot is provided in the bridge rail on the base and a vertical hole is drilled in the bottom of the bridge face to accommodate the T-bolts. Hook bolts are used for drawing the bottom of the bridge against a scraped edge on the bridge rails.

The bracket for supporting each boring unit has been redesigned. Mounting lugs for holding these brackets have been eliminated. The brackets are mounted on the bridge by T-bolts which are locked in place by means of a taper wedge action through a taper cross bore in the T-bolts. This method allows the brackets to be mounted tight against each other, holding the center distances between boring units to a minimum. Two opposed micrometer screws are located on the inside face of the bridge for lining each boring unit in the horizontal position.

As in the previous boring machines, a hydraulic brake unit is provided for stopping the boring tool as soon as the finishing cut is completed. The hydraulic cylinder operating each boring unit brake is now located on the back end of the spindle bridge directly below the individual brakes. A valve for controlling the coolant directed on the boring tools is mounted on the back of the machine on the base just below the fixture table level. It is actuated by an adjustable dog as the table passes back and forth.

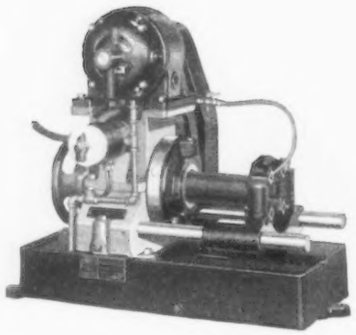
The particular machine here illustrated was designed to bore both the large and small end of a connecting rod in one operation. Six boring units are used on each end of the machine, the bottom row boring the bronze bushing on the small end of the rod and the top row boring the babbitt in the large end of the rod. Each pair of boring units are mounted in a common mounting bracket holding the units rigidly in position.

The holding fixture is hydraulically operated. Rods are dropped into clamping is so arranged that the rods approximate locating nests and the are seated against their locating points and against the face of the rod before being clamped in position. Three rods are loaded on one side of the fixture while the three rods on the opposite side are being bored. Production per hour is about 350 complete rods. Approximately 0.010 to 0.012 in. of stock is removed on the diameter.

Portable Pipe Machine Has ½-2 In. Capacity

REGULAR pipe capacity of the new No. 512 Tom Thumb portable pipe machine recently brought out by the Oster Mfg. Co., Cleveland, includes all sizes from ½ to 2 in. with an extra capacity down to and including ¼ in. If desired, the machine can be furnished with an oil pump and base containing oil reservoir and also with or without a pipe cut-off attachment. Dies are of segment type held solidly in a holder. A separate die head is used for each different size pipe. The die head is merely slipped on two vertical studs on the carriage, and can be swung out of the way, when cutting off, to provide clearance for the pipe.

V-belts transmit the power from the motor to a spiral Micarta pinion and thence to a spiral gear on the worm shaft. The drive to the spindle is through a triple thread worm mounted on Timken bearings. A three-jaw, scroll-type chuck is mounted on the front end of the spindle and a three-jaw centering chuck operated by a hand-wheel is mounted on the rear of the spindle.



Tom Thumb portable pipe machine. Oil pump and reservoir and cut-off attachment can be supplied.

Intermediate Size Lifting Magnet

THE 39-in. diameter lifting magnet recently added to the type SA heavy-duty magnet line of the Electric Controller & Mfg. Co., Cleveland, was designed for use with overhead, crawler, gasoline or locomotive type cranes in foundries, scrap yards and similar applications.

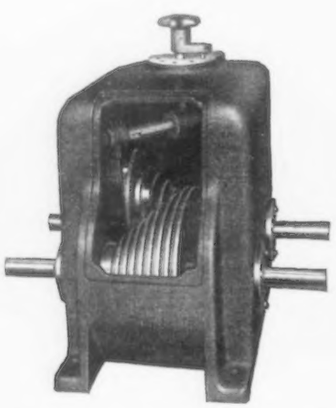
This magnet, designated as the No. 3½, requires a 5-kw. direct-current generator. The case is of high permeability steel with radial ribs on the top and sides, as shown, giving large radiating surface and assuring cool operation. Renewable pole shoes and heavily ribbed manganese steel outer bottom plate are held in position against the machined surfaces of the magnet housing by self-locking through-bolts. The magnet coil is strap wound, and is treated by a vacuum impregnation process to make it moisture-proof. After it is placed in the magnet case, all intervening spaces in the magnet are filled with a plastic compound to assure a permanent water-tight seal. Each magnet is furnished with two connecting cables and two new style cable connectors. The company's new automatic discharge magnet controller, consisting of a small two-position master switch and a steel safety cabinet containing the contactors and resistors, is furnished.

This 39-in. diameter magnet is suitable for foundry and scrap yard use.

"Multi-Speed" Transmission

GENERAL Radial Drill Co., announces a line of "multi-speed" change boxes using the Gibbs' V-disk transmission. High efficiency, long life and low maintenance costs are claimed. This transmission is made in ratios up to 9 to 1, and in sizes from ¾ to 10 hp. There are eight changes of speed, and the drive is positive, the idler disk setting up a wedging action in direct proportion to the load it transmits. Speed changes are made simply by means of a star knob located on top of the unit.

The grooved cones are of steel and are mounted on steel shafts supported by ball bearings. The composition disk runs as an idler between the cones and is the only part to wear, excepting the ball bearings. The transmission proper runs dry. The shaft ball bearings are the only points for lubrication and these from the outside.



Eight changes of speed are provided in this Multi-Speed change box, which employs Gibbs V-disk transmission.

New Split-Phase Motors

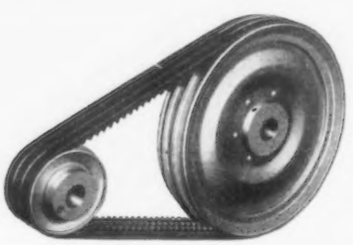
TWO new split-phase motors, designated as the No. 44RB and the 56RB, respectively, are being marketed by the Wagner Electric Corpn., 6461 Plymouth Avenue, St. Louis.

Completely redesigned, these motors are said to be cool, vibrationless and quiet in operation. The 44RB motor is made in 1/30 and 1/20-hp. sizes and the 56RB machine in ⅛, 1/6 and ¼-hp. sizes, 1725 and 1140 r.p.m., all cycles. Features include drip proof end-plates, liberal wool-yarn lubrication, and a conduit box that may be adjusted to four positions. The 44RB motor has a redesigned switching mechanism.

V-Groove Pulleys for Smaller Horsepowers

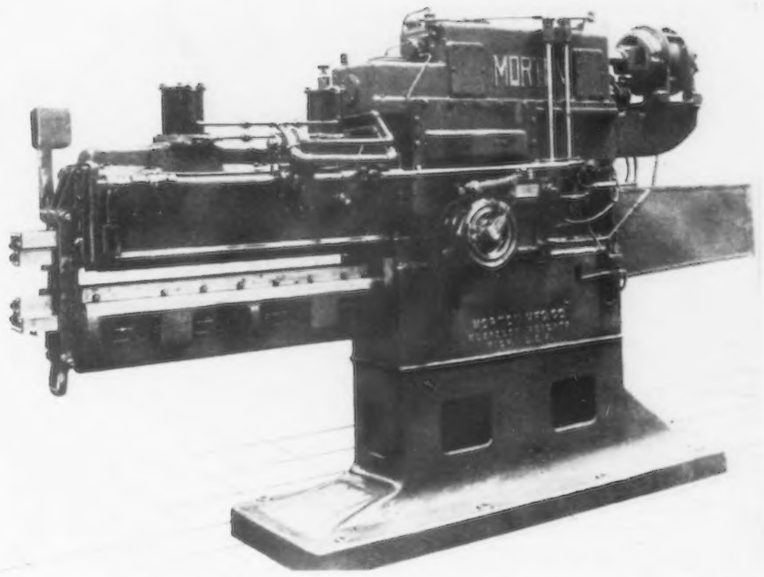
SINGLE and multiple V-groove pulleys designated as the Day-Steel, for use with Dayton Cog-Belts, have been added to the line of the Dayton Rubber Mfg. Co., Dayton, Ohio.

These pulleys are for ratings of 7½-hp. and below, and being of light weight, they are said to be especially suitable for machines requiring these smaller horsepowers. They are accurately formed from heavy gage pressed steel, welded both at the rim and at the web, and are rigidly assembled. The hub construction is said to be such as to assure accurate balance and true running of the pulley, as well as ruggedness and pleasing proportions. The pulleys have an aluminum finish.



Light weight is a feature of these V-groove pulleys, which are intended for ratings of 7½ hp. and below.

Draw-Cut Machine Trims Flash from Welded Steel Barrels



Two rams that carry a multiple number of tools remove the flash from both sides of the welded drum at the same time. Length of stroke is adjustable.

FOR rapid removal of the flash or upset left from the butt or flash welding of barrels, tanks, or sheets, the Morton Mfg. Co., Muskegon Heights, Mich., is offering the 40-in. stroke high-duty draw-cut flash trimming machine illustrated.

Two rams remove the flash from both sides of the welded drum at the same time. They carry a multiple number of tools which may be adjusted conveniently for height. Straightening rollers mounted ahead of the cutting tools aid in taking out any warpage caused by the welding heat or the handling. There is a clearance of 2 in. between the rams at the time of loading and unloading, so that any condition of warpage is readily taken care of. The machine trims very close both inside and outside.

The upper ram is carried in a guideway which is movable vertically and forms a base for attaching the upper clamping jaw. The vertical movement of this guideway is accomplished by means of air cylinders and levers that provide sufficient pressure for straightening and clamping the work. By compensating for any variation in the thickness of the stock, this arrangement provides one of the essentials of close stripping.

Rams are reciprocated by means of reversing clutches, so controlled that the machine makes one cycle and stops. The lower ram is carried in a solid guideway, and is so constructed that all trimmings removed from the inside of the welded drum drop through openings and are carried either to the front or to the rear. Means are provided for securely locking both the upper and lower housings while the machine is taking its cut.

Length of stroke may be adjusted by removing the tappets on a tapped disk at the side of the machine. Cutting is accomplished on the draw stroke. The rams reverse automatically at the extreme inner end of the stroke, the upper ram rising a distance of 2 in. This enables easy removal of the work while the rams are returning to the outer position, a feature emphasized as saving considerable time.

Heavy, rigid construction, ample lubrication and convenient control and adjustment are features of the machine, which is available in several different sizes. The 40-in. stroke flash trimmer illustrated is driven by a 5-hp. motor, either variable-speed d.c. or constant-speed a.c., and requires operating floor space of 14x15 ft. Actual floor space occupied is 3x14 ft.

Increased Speed Features New Arc Welder

UNIFORM welding current is an outstanding claim for the "Shield Arc" welder being placed on the market by the Lincoln Electric Co., Cleveland. By leveling the hills and valleys, or the rapid fluctuations of welding current, the new machine is said to allow use of a higher average current for a given size rod, which permits considerable increase in the speed of welding and in the amount of weld metal deposited.

With a rating of 40 volts instead of 25, the new machine has 60 per cent greater kw. rating than before. The larger capacity of the welder, coupled with its higher average currents is said to make possible new efficiencies in welding with "shielded arc" type electrodes.

Uniform welding current and increase in rating to 40 volts are features of this Shield-Arc welder.

The design of these welders is such that use of a stabilizer or kick transformer is unnecessary. Elimination of such losses together with the reduction of other machine losses is said to make possible approximately 10 per cent higher efficiency at full loads and even more on overloads; also a much less no-load loss.

A dual control permits independent regulation of current and voltage. Since with shielded arc welding reversed polarity is widely used, a reversible voltage control which reverses the direction in which the current is generated is provided. This control eliminates shifting of cable connections to change the polarity of the welding current, and is operated by turning a small lever on the control panel. A center reading volt ammeter on the control panel shows whether the machine is operating with positive or negative polarity, as well as indicating the voltage and amperage.

The "Shield-Arc" welders are built in alternating and direct current motor-driven types of 300, 400 and 600-amp. sizes. Removable running gear and draw bar facilitates changing from portable to stationary model.

In the article in THE IRON AGE, July 7, entitled "New Alloy Cement for Hard Metal Carbides," credit should have been given to Dr. E. P. Polushkin of the School of Mines of Columbia University for the photomicrographs and a special method of polishing developed by him.

Continental Steel Market Is Disorganized by Belgian Strike

Practically All of Charleroi District in Belgium Shut Down by Coal Mining Troubles—Prices Nominal

LONDON, England, July 11 (*By Cable*).—The markets are quiet. Holiday periods have begun. Little revival is expected before autumn despite the favorable influence of the Lausanne agreement on reparations.

The Continental market is disorganized by a coal miners' strike in Belgium, which is involving steel works. Practically all of the Charleroi area is shut down. Meanwhile Belgian steel prices are nominal.

The Welsh tin plate situation is stronger because of increasing demand and decreased output under the pooling plan. Export orders have been coming from France and Australia.

Recent Russian orders for British material are for 70,000 tons of plates, sheets and strips, of which more than 40,000 tons was bought on 18 months' credit. Prospective business includes orders for high-speed steel. Birmingham electric furnace makers have secured a contract for 37 electric furnaces for the Chaliabinsk Tractor Works.

The British advisory committee on import duties is now receiving applications for the placing on the free list of many classes of machine tools and other machinery.

The Continental Wire Rod Cartel and the Continental Wire Syndicate will meet at Ostend late in July with a view of establishing a common price policy. The Austrian Wire Makers' Syndicate has been dissolved, and prices have declined about 25 per cent.

The Polish Sosnowickich tube works has closed its steel plant and rolling mills and Huta Bankowa has ceased manufacturing plates and tubes. The former company is drawing its supplies of steel from the latter, which is handing over its market quota on plates and tubes to Sosnowickich. The German Friedrich Alfred Hütte Rheinausen will resume full operations on July 13. Guttehoffnungshutte has resumed operations on the previous scale.

One hundred Russian blast furnaces are now active and the third and fourth Magnitorgorsk furnaces are approaching completion.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9 0s.	
Billets, open-hearth	4 17 6d	to £5 7s. 6d
Black sheets, Japanese specifications	9 12 6	
Tin plate, per base box	15 3	to 15 6
Steel bars, open-hearth	£7 17½	to £8 7½
Beams, open-hearth	£7 7½	to £7 17½
Channels, open-hearth	£7 12½	to £8 2½
Angles, open-hearth	£7 7½	to £7 17½
Black sheets, No. 24 gage	8 0	to 8 10
Galvanized sheets, No. 24 gage	9 5	to 9 7 6

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£1 18s.
Wire rods, No. 5 B.W.G.	4 10
Black sheets, No. 31 gage, Japanese	11 5
Steel bars, merchant	2 2
Beams, Thomas	2 1 6d
Angles, Thomas, 4-in. and larger	2 1
Angles, small	2 3
Hoops and strip steel over 6-in. base	3 5
Wire, plain, No. 8	5 7½
Wire, barbed, 4-pt., No. 16 B.W.G.	8 15

Corrigan, McKinney Steel Co., and Newton Steel Co. Affiliate

PLANS for the affiliation of the Corrigan, McKinney Steel Co. and the Newton Steel Co., with plants in Monroe, Mich., and Newton Falls, Ohio, which have been under consideration for some time, have been agreed upon by the former company and Edward F. Clark, president, and other large stockholders of the Newton company acting for themselves and for other Newton stockholders who may wish to participate in the plan.

Announcement of the terms has been made by William G. Mather, chairman of the board, and Donald B. Gillies, president, Corrigan, McKinney Steel Co. and Mr. Clark. Other Newton stockholders who are participants in the agreement are H. C. Fownes, 2nd, and R. T. Wilson, Pittsburgh, J. W. Ford, Youngstown, and Elton Hoyt, 2nd, Cleveland, who are directors of the Newton company.

At present the Corrigan, McKinney Steel Co. has no outstanding bonds or preferred stock, its entire capitalization being 2500 shares of $100 par value common stock. In order to provide a practical unit to offer Newton shareholders, it is proposed that the Corrigan, McKinney company amend its articles of incorporation to provide an authorized capital stock of 1,500,000 common shares, with a stated par value of $1 each and consisting of 1,146,450 voting shares and 353,550 non-voting shares. Under the plan Newton stockholders are offered the opportunity of exchanging their stock on the basis of receiving one voting and one non-voting share of Corrigan, McKinney stock for each share of Newton preferred stock and 4/10ths of a voting share and 1/10th of a non-voting share of Corrigan, McKinney stock for each share of Newton common stock.

Deposits Required by Aug. 15

Stockholders of the Newton company are to deposit their stock with the Union Trust Co., Cleveland, the period for deposit expiring Aug. 15. To be effective, the plan calls for the deposit of 67 per cent of each class of shares of the Newton company. However, the Corrigan, McKinney company has the right to declare the plan operative should a smaller percentage of Newton stock be deposited.

The Newton company is a large producer of full-finished sheets. Its Monroe plant, placed in operation in 1930, has 10 hot black sheet mills and six stands of 26-in. cold rolls, with an annual capacity of 200,000 tons. The Newton Falls plant has 20 hot black sheet mills, with the same capacity. There has been talk of converting the Newton plant into a tin plate mill, but no decision has been reached. The Corrigan, McKinney company has a large capacity for the production of semi-finished steel and for several years has supplied the Newton company with sheet bars. The proposed affiliation, if consummated, will assure the Newton company its supply of raw material and the Corrigan, McKinney Co. an outlet for considerable of its products.

Steel Barrel Output Lower in May

WASHINGTON, July 12.—Production of steel barrels in May totaled 427,299 units, against 447,379 in April, according to reports received by the Bureau of the Census from 27 establishments. The output in the first five months of 1932 totaled 2,054,129 barrels, compared with 2,624,718 in the corresponding period of last year.

Chicago, Burlington & Quincy has ordered 350 men to report for work at its Aurora, Ill., shop. A week ago 300 men were called to these shops.

Steel Companies Urge Embargo to Stop Foreign "Dumping"

In Letter to Members of Congress, National Association of Flat Rolled Steel Manufacturers Asks for Action

IN a letter and brief submitted to every member of Congress, the National Association of Flat Rolled Steel Manufacturers, through its president, George H. Charls, declares that the situation with respect to the alleged dumping of foreign steel in the United States has become so crucial that it demands extraordinary remedial measures, and advocates an embargo.

"The situation," says the letter to members of Congress, "is beyond the control of the steel industry and, if permitted to continue, will assuredly bring further disaster to the industry and the 600,000 employees depending upon it for a livelihood. This unprecedented competition has gone so far it hardly can be arrested by readjusting the tariff to take care of the depreciated currencies abroad. It is also doubtful whether the anti-dumping act or the flexible features of the tariff act are adequate.

Appeals for Prompt Action

"Under these critical circumstances the steel industry is without recourse unless the Government closes our ports to this abnormal competition or enacts other remedial emergency measures promptly. Having put our house in order and having received no relief through the established governmental agencies, we appeal to you and your colleagues for prompt action."

The briet accompanying this letter of transmittal is signed by the following executives of steel companies having membership in the National Association of Flat Rolled Steel Manufacturers:

Acme Steel Co., R. H. Norton, president. Alan Wood Steel Co., H. C. Thomas, vice-president.

Allegheny Steel Co., H. E. Sheldon, president.

American Rolling Mill Co., C. R. Hook, president.

Apollo Steel Co., A. M. Oppenheimer, president.

Blair Strip Steel Co., George D. Blair, president.

Bopp Steel Corpn., A. J. Bopp, president.

Brainard Steel Corpn., E. Theodore Sproull, president.

Canonsburg Steel & Iron Co., Howard W. Edwards, president.

Continental Steel Corpn., D. A. Williams, president.

Detroit Steel Corpn., W. C. Shrage, president.

Eastern Rolling Mill Co., A. J. Hazlett, president.

Empire Steel Corpn., C. H. Henkel, president.

Follansbee Brothers Co., W. U. Follansbee, chairman.

Granite City Steel Co., Hayward Niedringhaus, president.

Great Lakes Steel Corpn., George R. Fink, president.

Greer Steel Co., H. C. Greer, president.

Griffin Mfg. Co., James C. Griffin, president.

Gulf States Steel Co., L. E. Geohegan, vice-president.

Inland Steel Co., L. E. Block, chairman.

Laclede Steel Co., Thomas R. Akin, president.

Mahoning Valley Steel Co., W. Aubrey Thomas, president.

National Steel Corpn., E. T. Weir, chairman.

Newport Rolling Mill Co., A. K. Andrews, president.

Newton Steel Co., E. F. Clark, president.

Otis Steel Co., E. J. Kulas, president.

Parkersburg Iron & Steel Co., C. F. Niemann, president.

Pittsburgh Cold Rolled Steel Co., M. C. Summers, president.

Pittsburgh Steel Co., H. D. Williams, president.

Reeves Mfg. Co., A. J. Krantz, treasurer.

Republic Steel Corpn., Tom M. Girdler, chairman.

Seneca Iron & Steel Co., K. L. Griffith, president.

Sharon Steel Hoop Co., Henry A. Roemer, president.

Stanley Works, C. F. Bennett, president.

Superior Steel Corpn., Frank R. Frost, president.

Thomas Steel Co., C. G. Thomas, president.

Wallingford Steel Co., E. B. Cleborne, president.

Weirton Steel Co., J. C. Williams, president.

West Leechburg Steel Co., James Lippincott, president.

Wheeling Steel Corpn., W. W. Holloway, president.

Youngstown Sheet & Tube Co., Frank Purnell, president.

Situation Declared Crucial

The opening paragraphs of the brief state the situation as follows:

If we are to save the American steel industry, its workers, stockholders and all those industries and utilities depending upon it, from the economic madness now rampant in Continental Europe; if we are to prevent more paralyzing unemployment; if we are to restrain all our coastal business from seceding to European mills, some immediately effective emergency action is imperative.

Never in the history of the steel industry have such demoralizing prices been made as in the reckless dumping of foreign steel in the United States today; cargoes of wire dumped into the heart of Chicago; bars into Detroit, wire, bars, shapes, plates, strips and sheets dumped along our entire seaboard, at prices which —with duty paid—are ten to twenty-five dollars per ton less than American producers can name.

It is a crucial situation.

The English Situation

Then follows a reference to the recent adoption of higher tariffs on steel by Great Britain with this comment:

When England, the bulwark of free trade, finds it necessary to boost her tariff —not, as some would have us believe, in retaliation to the American tariff policy, but actually to save her steel industry from being closed down tight by the influx of cheap Continental steel—it is in order that the United States take heed and act at once.

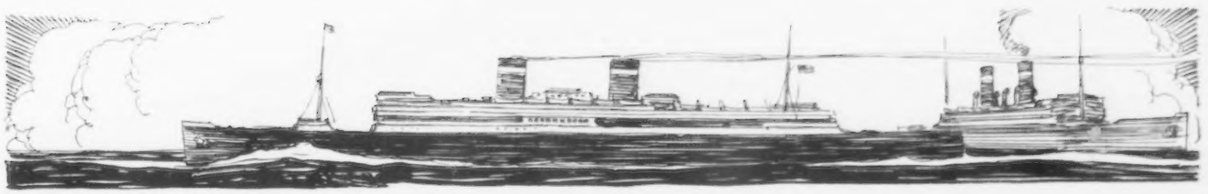
France, to protect her home markets (although dumping in other countries), is virtually embargoing steel by a system of license arrangements which limits almost to the zero point the tonnage which can be imported from other countries. According to the last report, the United States is limited to eighty tons of sheets per month.

From a prominent steel producer in England we have the following: "Sheet bars are being sold in this country at 81 shillings delivered into South Wales with a 33⅓ per cent duty to pay. This leaves the Belgian not more than 39 shillings per ton at his works for tinplate bars, which is certainly 12 to 13 shillings per ton below the cost of the pig iron required for the manufacture of bars."

Aware of what has happened in England will we supinely submit to this foreign dumping dementia being imposed upon American industry, with its corollary, the character-desiccating dole?

The American steel industry asked for no increase in duty in the Smoot-Hawley Bill of 1930, and it received none. The existing rates are those of the Fordney-McCumber bill of 1922.

Under normal conditions these rates



would suffice and reasonably protect American workingmen and producers.

But the conditions are not normal because with all the protection the tariff can afford and if common labor in the production of American steel were reduced to 75c. a day or $19.50 a month, American producers could not possibly meet this foreign competition. These, incidentally, are the labor rates paid by the most aggressive foreign producers invading our shores.

With the American steel worker, whose wages were never inflated, now working 20 per cent of the time, bearing up under wage reductions of 25 per cent or more; with practically every steel corporation's statement showing large losses; with steel executives exhausting every recourse to furnish some sort of employment to their men, any further temporizing with this menace will be fatal.

Cites Large Financial Losses

Then citing the losses of almost $30,000,000 by 19 leading steel producers in the first quarter of this year, the association declares that "political differences of opinion on protective measures become unworthy in the face of this crisis. Only coalition and sound, economic statesmanship can save us; increased hardships and distress for hundreds of thousands of steel workers is the alternative."

Analyzing the causes behind the alleged dumping of European steel in this country, the brief says:

The gist of the whole deplorable affair is that the principal steel works of Belgium have turned their plants into public utilities for providing gas, electricity and power to the more populous districts of that country according to quotas arranged among themselves.

This gave them a tremendous advantage in selling cheap steel. Then came the depreciation of the pound sterling and the increased British duty. This action struck consternation to the hearts of the steelmakers in Belgium, France, Luxemburg and Germany, because England was their most important market."

However, the Belgian steel producers, driven by the necessity of their municipal contracts to operate, must dispose of their steel. Possibly hoping that the gold standard would be restored and the duty eliminated, they continued delivered sterling prices only slightly higher than those they had accepted before, and absorbed both the 33⅓ per cent duty and the 25 per cent depreciation in pound sterling.

The French and German steelmakers were compelled to follow suit.

On top of this, wages were reduced in Belgium and common labor receives approximately 75c. a day; rollers $1.75 to $2.25 a day. Only slightly higher wage rates apply in France and Germany.

In the two latter countries they have some assistance from an export bounty, which averages 10 to 30 per cent. This bounty is paid at the expense of the domestic client who pays higher prices for equivalent product. It is not, as is commonly understood, a government refund but a pool made up by manufacturers. All Belgian-Luxemburg steel is sold through a syndicate but there is no information on any bounty on exports, their municipal contracts for gas, electricity and power evidently take care of that.

In addition to the above, unbelievably low ship rates are obtained to all foreign countries. As low as $3 per ton applies from Antwerp to the United States and it is more than probable that there is a rebate beyond these published rates.

As a result, at shareholders' meetings in France and Germany it is a common confession that plants are being kept working by recourse to sales abroad at disastrous prices. Prices are down 50 per cent since 1930, leaving producers with a loss of 30 to 40 per cent on the cost of production, according to testimony of the French Comité des Forges.

This same Comité des Forges is forced to the conclusion that the only real remedy lies in international ententes to make production conform to consumption. They state, "The process of deflation might work itself out in its own way—unless, indeed, the problem of unemployment and social discontent becomes such as to force governments to step in and try to regulate industries."

This is the "economic madness" and "foreign dumping dementia" referred to in previous paragraphs. It seems to call for the most effective barrier possible, namely, an embargo.

Our Exports Low in Comparison

Referring to the fact that the maximum of steel exported by the United States in any one year was about 2,480,000 tons in 1929, the association declares that since 1921 this country has not exported more than about 6 per cent of its steel production, while Belgium and Luxemburg, with a maximum annual production of a little over 6,000,000 tons, have not exported less than 2,471,000 tons in any year since 1922. In 1931, the brief states, these countries exported 3,650,000 tons, against 725,000 tons by the United States in the same year. In the past seven years English exports of steel have averaged from 36 to 83 per cent of all the steel that country produced, while in the same period German exports have ranged from 26 to 47 per cent, French from 43 to 70 per cent and Belgium-Luxemburg from 69 to 76 per cent.

Now that the European countries are facing restricted export markets elsewhere in the world, they are "dumping their cheap products in the United States." The association states that the term "cheap products" is used advisedly and adds: "It is cheap Bessemer steel, usually quoted at $5 a ton lower than what is termed good open-hearth steel by the makers themselves. Galvanized sheets made in Belgium, it is stated, have been found to average 8/10 oz. of zinc coating per square foot. This product is so cheap in price that all labor charges were eliminated from the cost of galvanizing these sheets. American producers could not compete, it is further declared.

Declares Protection to Be Essential

The brief concludes with the following statement:

The question of protecting American steel interests is no longer debatable. Especially is this true if we keep definitely in mind that every ton of foreign steel imported into the United States means the loss of approximately four days' work to some steel laborer.

In addition thereto it means a loss by the railroads and their employees of the transportation of four to five tons of raw material necessary for the production of one ton of finished steel, together with a proportionate loss to all industries, utilities and labor serving the steel industry.

The seriousness of the situation is demonstrated by what occurred in 1931, when 370,000 net tons of imported steel caused the loss of a week's work to 237,000 men in the steel industry and 37,000 coal miners, and the loss in revenue and wages to the railroads of transporting approximately 55,000 cars at an average of 33 tons per car.

One can easily be internationally-minded and maintain a liberal attitude regarding the advantages of a free interchange of products between nations until confronted with an increased unemployment and destitution among friends and neighbors due to the importation of foreign goods.

This is indeed just what we have to contend with now and it is to be hoped that any further temporizing with this desperate situation will be supplanted by determined measures to effect their remedy, which seems to exist only in an embargo against all dumping of foreign steel in the United States.

Congress Leaders Opposed to Embargo on Foreign Steel

WASHINGTON, July 12.—Emergency legislation embargoing imports of steel is highly improbable, according to members of Congress whose views were asked regarding the petition filed last Thursday by President George H. Charls of the National Association of Flat Rolled Steel Manufacturers urging that American ports be closed to incoming shipments. It was pointed out that such drastic action would be unprecedented and invite retaliation, and that sentiment in Congress is strongly opposed to such a move.

The plea of the association, however, was recognized as being one of real merit and the hope was expressed that the steel industry would resort to effective remedies. Members of Congress who have observed the demoralizing effect of incoming shipments of low-priced steel acknowledged the strength back of the forcefully-worded petition.

"I think the steel people have made a good case," said Senator Reed of Pennsylvania, ranking Republican member of the Committee on Finance. "But the industry should turn for relief to the Treasury Department."

Senator Reed is preparing to offer an amendment to the relief bill which will require that all Government departments be required to purchase American materials exclusively, wherever possible, and that contractors for government work in letting

subcontracts be compelled to do likewise. The proposal is similar to a bill offered several months ago in the House by Representative Riley J. Wilson of Louisiana on which no action has as yet been taken. By including subcontractors, the proposal overcomes a ruling of Comptroller General J. C. McCarl that present provisions in the Army and Navy appropriation acts for the purchase of domestic articles are applicable only to direct purchase or contracts for direct purchase.

Senator Reed's Amendment to Specify American Material

The amendment would not meet the plea of the petition but, it was pointed out, it would be helpful, since under existing law foreign steel can be used in Government work. The practice, however, has been reduced to a minimum, partially because of the attitude of Government officials, sometimes supported by orders, that domestic industry should be patronized to the fullest degree possible. Senator Reed will offer the amendment when the relief bill comes up for final action, President Hoover having vetoed the bill as passed. Senator Reed will submit the amendment to the President's anticipated bill. It is believed it will be passed with the amendment and at least afford the steel industry a degree of relief.

Smoot Sees No Chance for Emergency Legislation

"If the steel interests can prove unfair practices, the imports could be barred under Section 337 of the tariff act," said Senator Smoot of Utah, chairman of the Finance Committee and co-author of the Hawley-Smoot law. "I do not think there is any chance for the suggested emergency legislation."

The section referred to by Senator Smoot, however, would call for an investigation by the Tariff Commission and necessarily would entail much delay at a time when quick action is sought. Morever, it is not believed the President would be inclined to proclaim an embargo.

Representative George P. Darrow of Philadelphia said that Congress ought to give preference to American materials and workmen and enact legislation to that end at once. He said that embargo legislation would develop foreign complications.

Dumping Duties May Be Applied

Meanwhile, efforts have been under way for sometime to get relief for the domestic steel industry through the application of anti-dumping duties. The American Iron and Steel Institute has before the Bureau of Customs two complaints charging dumping of foreign steel. The first relates largely to hoop and strip steel, but the second one is extremely broad and covers virtually all rolled products. The bureau also has a complaint against the dumping of foreign pig iron. The great length of time it requires the bureau to act, however, largely negatives its work, even where it provides the relief sought. Protests also are often heard that the Treasury Department is timid in taking such action despite the force of the domestic case. The National Association of Flat Rolled Steel Manufacturers, however, not only wants immediate and sweeping action taken, but takes the position that the value of an anti-dumping duty or of increased rates under the flexible provision of the Tariff act is doubtful. There are a number of petitions before the Tariff Commission for a 50 per cent increase in steel duties. Among the products affected are hoops, bands and cotton ties.

Bill to Provide for Use of Domestic Materials

The plan of Senator Reed to submit an amendment providing for exclusive use of American materials in Government work was made known after he was visited by W. D. Mayhew, Montgomery Iron & Steel Co., Philadelphia, and president of the Northeast Chamber of Commerce of Philadelphia. Mr. Mayhew explained that the Garner-Wagner bill did not carry such a provision. Senator Reed stated that he would submit the amendment when the President's relief bill comes before the Senate. Mr. Mayhew said he uses only domestic steel, despite the cheapness of foreign steel.

Senator Reed also was called upon at the same time by Thomas J. Doherty, tariff counsel, American Iron and Steel Institute, and John Hughes, assistant to the president of the United States Steel Corpn. Mr. Doherty and Mr. Hughes called upon Senator Reed after attending a rehearing before Customs Commissioner F. X. A. Eble regarding the marking of reinforcing bars with the country of origin. Mr. Doherty and Mr. Hughes are said to have told Senator Reed of their hopes of relief for the steel industry through this proceeding, anti-dumping cases, and readjustment of values of foreign currencies in assessing duties.

It is understood that customs inspectors now are giving close attention to imports of steel and where it is suspected they are being dumped they are being held up. By some it is believed that an alert check-up of this kind with the holding of the steel from domestic markets pending inquiry as to whether it is being dumped will in itself be of considerable aid to the domestic industry.

On the same day that the petition of the National Association of Flat Rolled Steel Manufacturers was filed and the rehearing before Commissioner Eble was taking place, Charles F. Abbott, executive director, American Institute of Steel Construction, called upon President Hoover. In a statement given out at the White House, Mr. Abbott said that the proposed self-liquidating public works program of the President "would undoubtedly prove to be a stimulating effect upon all business."

Hearing Held on Marking of Foreign Reinforcing Bars

WASHINGTON, July 12.—At the conclusion of a rehearing last Thursday before Customs Commissioner F. X. A. Eble relating to the marking of imports of concrete reinforcing steel bars with the country of origin, he announced that an early and final decision would be made. The original decision upheld domestic producers who insisted that the imported material should be marked with the country of origin and June 14 was named as the effective date for such marking. At the request of importers, who asked for an extension of time, the date was extended to July 14. They also asked for the rehearing in order to submit new evidence. It is expected that the final decision will be announced on or before Thursday of the present week, the effective date of the original decision. Domestic interests expressed confidence that the finding would be reaffirmed. They claim that no new evidence was produced by importers at the rehearing.

Importers were represented by Curry Lane, attorney, and George Dix, New York, of the Steel Union. The domestic makers were represented by Thomas J. Doherty, tariff counsel, American Iron and Steel Institute, and Frederick R. Gibbs, Concrete Reinforcing Steel Institute.

The marking of foreign bars was protested on the ground that it is not practical and would increase the cost of production. Mr. Lane declared, however, importers could not show the increased cost except through actual experience of handling the material. Efforts to do so, he stated, have been discontinued pending the receipts of orders for foreign reinforcing bars. Mr. Dix said that if the Government required such marking in connection with rolling operations it would practically eliminate imports of concrete bars. He declared that he has already been compelled to cancel an order for 150 tons of reinforcing bars by reason of the order of the Customs Bureau.

The importing interests sought a modification of the decision to permit the bundling of reinforcing bars with a band or tag showing the country of origin.

Mr. Doherty declared that, under the tariff law, marking imports with the country of origin where practical, is mandatory, and he insisted that it

is practical since it is done by domestic mills. The proposal to bundle bars with a band or tag indicating the country of origin was vigorously opposed. He pointed out that reinforcing bars do not go to consumers in bundles but are separated and cut or fabricated.

Protest also was made against the proposal of importers that an individual letter be rolled into each bar, such as the letter "U," to indicate the country of origin. Mr. Doherty said the suggestion is impractical because the latter "U" is a symbol of a domestic bar, made by the Gulf States Steel Co., and also because it might be mistaken to mean the United States Steel Corpn. He also declared that a decision of a court upholding the tariff act which does not require marking where it interferes with the sale of a product does not apply to reinforcing bars. His statement was made to combat the citation of such a decision by Mr. Lane who referred to a court ruling against the necessity of marking lamp shades and statuary. Mr. Gibbs dwelt upon the fact that markings could be rolled into foreign steel and urged with Mr. Doherty that the Bureau reaffirm its decision.

Others present at the rehearing were John Hughes, New York, assistant to the president, United States Steel Corpn.; W. C. Oberg, Carnegie Steel Co., Pittsburgh; Harry F. Knapp, manager of the Washington district office, United States Steel Corpn., and E. R. Leonard, manager of the Washington district office, Bethlehem Steel Corpn.

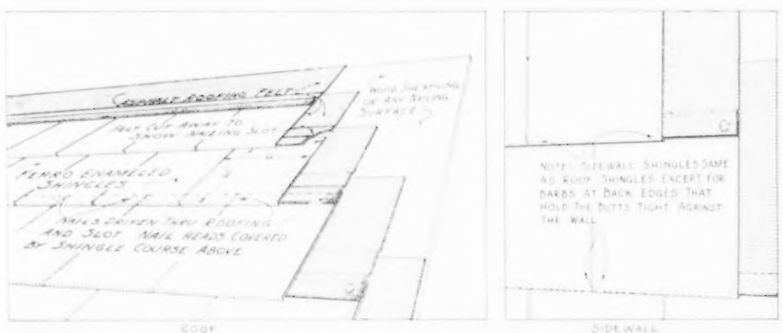
Fabricated Plate Orders in May Decline

WASHINGTON, July 12.—Bookings of fabricated steel plate in May totaled 13,018 tons, against 14,074 tons in April, according to reports received by the Bureau of the Census from 51 identical manufacturers. The May orders in tons were distributed as follows: Oil storage tanks, 2310; refinery materials and equipment, 419; gas holders, 933; miscellaneous, 9356. Orders in the first five months of 1932 totaled 75,024 tons as compared with 139,138 tons in the corresponding period of last year.

A treatise on the separation of such feebly-magnetic substances as iron oxide, garnet, hematite, slate and wolframite from non-magnetic substances is included in a new bulletin published by Dings Magnetic Separator Co., Milwaukee, describing the new Dings Type IR super-high intensity magnetic separator. Also included is a report of important research in the subject of trajectories described by magnetic and non-magnetic materials from an induced roll.

House to Have Porcelain Enamel Siding on Insulated Steel Sheets

CONSTRUCTION of a porcelain enamel covered steel frame residence, the first of this type to be built, has been started in South Euclid, Ohio, a Cleveland suburb, by the Ferro Enamel Corp., Cleveland. It was the original intention when the plans for this house were announced to cover the outside of the building with porcelain enameled steel panels. However, the plans were changed and the exterior walls will be covered with porcelain enamel steel shingles of a new design, patents on which the Ferro company recently acquired.



PORCELAIN enamel shingles of a buff color will cover the outside walls, with courses of blue-green shingles at the foundation line and beneath the coping. Roof shingles will be in three shades of russet. Shingles are vulcanized on the back in groups of six to asphalt roofing material to make for rapid application. Back of the shingles is Ferro-Clad, a combination of steel sheets and Celotex, fabricated in the shop to avoid window and door cuttings on the site.

The backing for the shingles consists of Celotex ¾ in. thick, covered on either side with 24 gage sheet steel. This product of Celotex and steel is manufactured by the Truscon Steel Co., Youngstown, and has a trade name of Ferro-Clad. The Ferro-Clad was fabricated and the sections numbered at the factory to avoid cutting out doors, windows, etc., on the job.

To the steel frame of the house 2 x 4-in. wood members are bolted and to these the Ferro-Clad sheets are nailed. On the inside metal lath is nailed to the wood members. The 4-in. space between the lath and plaster and the inner side of a Ferro-Clad outer covering will be filled with mineral wool for insulation.

The shingles made of 26 gage porcelain sheets are backed with asphalt roofing material which is vulcanized to the shingles. This felt roofing extends about 6 in. above the top of the shingle. The upper portion that is not attached to the shingle furnishes a backing for the shingle that is laid over it. Six shingles are vulcanized to one strip of asphalt, forming a unit 36 in. wide and the shingles are applied to the wall or roof in their unit form, making application fairly rapid.

The side wall shingles have a very narrow inner flange and barbs at the lower edge. The asphalt roofing material is doubled along the shingle edge and the barbs fit under this edge, holding the shingle tightly to the wall. The shingle is fastened by two nails near the upper edge, the nails being clinched under the Celotex backing. The next course of shingles covers up the nail heads. The shingles are 6 in. wide and the exposed surface of the shingle is about 6 in. deep. The roof shingles are similar to those used for the side walls except that they are not provided with the holding-down barbs. The roof shingles may be attached to wood sheathing or any other nailing surface.

The main body of the wall will be in a rich buff limestone color. A color contrast will be provided by using blue-green shingles four courses wide around the bottom of the house at the foundation line and two courses of the same color just beneath the coping. A dull finish enamel is being used. The roof will be in three shades of russet or brick color.

The first and second floors will be bar-joist, which will be covered with oak floors. The ceilings of the second floor will also be of bar-joist construction in order to make the residence nearly fireproof.

Malleable Castings Orders Off Slightly

WASHINGTON, July 12.—Orders for malleable castings in May amounted to 17,297 tons, against 17,630 tons in April, according to reports received from 117 establishments. Bookings in the first five months of the current year were 94,718 tons as compared with 166,461 tons in the corresponding period of last year.

OFF THE ASSEMBLY LINE

Hudson's New Light Car, To Be Shown July 21, Occupies Detroit Spotlight

DETROIT, July 11.

ALTHOUGH the usual seasonal slackening of retail automobile sales has been accentuated by the depression, and production this month will register a considerable decline from that of June, the development of this unsatisfactory situation had been discounted in advance in Detroit. The new light car to be disclosed shortly by the Hudson Motor Car Co. has taken the center of the stage in local interest and there is more discussion about the public reception of it than about the industry's current plight. The reason for this is that Hudson will be the first company to introduce a car designed primarily to provide transportation rather than the numerous gadgets and conveniences to which the motorist has become accustomed, with the price set sufficiently low to test the theory that people are waiting for a good car built and sold like the model T Ford on the sole basis of cheap travel.

It is said that the new Hudson-Essex car, probably to be called the Jackson, will have a six-cylinder, 68-hp. engine, a wheelbase of 102 in. (considerably shorter than any car now on the market) and a base price of about $425. The Hudson company is spending $4,000,000 on the new models which already are in production. On July 21 dealers from 40 States will drive away 2000 of the cars from the factory, this event being the occasion for a celebration which includes a spectacular parade. The company has already given releases for steel and pressed metal parts for about 3000 cars and this week is expected to place steel orders for the first sizable production run.

Other Programs Under Way

It now looks as though Hudson-Essex will be the sole occupant of the midsummer spotlight, as no other maker has a program for a new light car sufficiently advanced to announce it before late August or September. It is understood that Dodge has ordered some dies for its proposed four-cylinder car and there is a strong possibility that it will build the bodies in its own local plant. In recent years Dodge has bought all bodies from outside body makers, except those for one or two models which are manufactured in Chrysler's Kercheval Avenue plant. General Motors seems in no hurry to rush into the market with new models and its production program for the summer months at all divisions, including Chevrolet, is extremely slim. What will be made at the Pontiac plant still is a mystery, since development work on a new low-price car apparently has been indefinitely suspended. Reports emanate from Toledo regarding the vigorous rejuvenating program at Willys-Overland, which is rapidly getting under way under the guidance of John N. Willys.

New, small car sponsored by Hudson to be announced July 21. Base price is reported to be about $425.

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Detroit employment on June 30 was at the highest point of the year.

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July motor car production expected to be 160,000 cars. First half output estimated at 912,353 cars.

Auburn last month broke all previous June records with production of 3232 cars, as against the former high mark of 3219 in June, 1931. This, of course, is the result of the slash in prices which brought the Auburn down within a few hundred dollars of the lowest price class.

Ford production is declining gradually, with 80,000 to 85,000 motors scheduled for this month and not more than 70,000 in August. Ford's output of 95,591 units last month was about 50 per cent of the industry's total which is estimated by the National Automobile Chamber of Commerce at 190,600 cars. It is difficult to tell what this month's assemblies will be, because of the irregularity of production by some companies, but it is not likely to exceed 160,000 units.

In line with the seasonal trend, Plymouth and DeSoto will show a considerable decline in output this month, the two together probably accounting for 14,000 cars. Both cars have gone through record-breaking periods which have put the Chrysler Corpn. in the enviable position of being the only motor car manufacturer which has registered an increase in retail sales this year compared with last. In the first year of Plymouth's "floating power" car, ended July 6, the local plant built 150,000 cars, a remarkable achievement in the midst of the depression. DeSoto likewise accomplished the unusual in the first six months of this year by turning out 37,756 cars compared with 23,632 cars in the same period of 1931. Retail sales by DeSoto dealers in the first half of 1932 were 31,314 cars as against 18,526 for the corresponding half of last year. Used car sales showed a proportionate gain, amounting to 34,617 cars in the first six months of 1932, against 23,975 cars in the similar period last year. These figures include Plymouth as well as DeSoto transactions by De Soto dealers.

Die Shops To Be Busier

Detroit die shops are likely to be busy earlier than usual this fall, but there is slight chance that many new car programs will get beyond the drafting board stage in the next 30 days. In fact, during the next few weeks the engineering departments will be the busiest divisions of automobile companies. The Michigan Manufacturers' Association is authority for the statement that in the next 60 to 90 days automobile makers will spend at least $12,000,000 preparing new models.

OBITUARY

COL. EDWARD HALL WILLIAMS, president of the Vulcan Mold & Iron Co., Latrobe, Pa., and for 40 years prominently identified with the development of the iron and steel industry, was killed in an automobile accident near his home on July 7. He was born at Cleveland on Aug. 21, 1871, the son of E. P. Williams, who was for many years identified with Pickands, Mather & Co., Cleveland. Colonel Williams attended public school in Chicago, preparatory school at Washington University, St. Louis, and was graduated from the Case School of Applied Science in 1892 with a degree of B.S. in mining engineering. He began his career with the Illinois Steel Co., South Chicago, and after a short time became a chemist and blast furnace superintendent for Brown, Bonnell Iron Co., Youngstown, now part of the Republic Steel Corpn. In 1897, he returned to the Illinois company at Joliet, Ill., as assistant superintendent of all the blast furnaces and one year later became manager of blast furnaces for Pickands, Mather & Co. in the Shenango Valley of Pennsylvania, where he remained until 1906. During that time he had charge of construction and operation of the Toledo Furnace Co. at Toledo, Ohio. In 1906 he organized and became vice-president and general manager of the Perry Iron Co. at Erie, Pa., remaining there until 1913. He next served as manager of blast furnaces for the Thomas Iron Co., Easton, Pa., and remained there until 1917, when he enlisted in the Corps of Engineers at Camp Lee, Petersburg, Va., receiving a major's commission. In March, 1918, he was assigned to the office of chief of engineers at Washington, D. C., in charge of officer personnel, and was made a lieutenant colonel and a member of the War Department general staff in charge of recruiting officers for the entire Army. He was mustered out of service in April, 1920, with the rank of colonel, and a member of the permanent general staff of the United States Army. In that year he organized and became president of the Vulcan Mold & Iron Co., and had devoted his exclusive time and attention to that company for the last 12 years. He was a member of the American Society of Military Engineers and the American Iron and Steel Institute. A son, Edward R. Williams, is vice-president of the Vulcan company.

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SAMUEL INGHAM MERRILL, active leader in the hardware, iron and steel industry of southern California early in the present century, died at Los Angeles on July 6 at the age of 75 as a result of a traffic accident. Between 1881 and 1891 he was in the hardware business. In 1901, with a group of Los Angeles capitalists, he organized the California Industrial Co., Los Angeles, one of the largest iron and steel products plant on the Pacific Coast at that time. He became president in 1908 and in 1913 sold his interest. The corporate title of this company was changed to Southern California Iron & Steel Co. in 1914. Later the company was taken over by the Pacific Coast Steel Co., which in turn was acquired in 1930 by the Pacific Coast Steel Corpn., a subsidiary of the Bethlehem Steel Corpn.

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RAYMOND C. PENFIELD, retired manufacturer of machinery, rubber goods, war munitions and brick, died of pneumonia and throat paralysis at his home in New York on July 11. Born in Willoughby, Ohio, May 31, 1860, Mr. Penfield was the son of the late James Wakefield Penfield, founder and president of the American Clay Machinery Co. After being graduated from Wesleyan University, Middletown, Conn., in 1885, Mr. Penfield entered the employ of his father's company, which made machinery for clay working, manufactured tractors and did general foundry work. The elder Penfield died in the early 90's and the son succeeded him as president. In 1914 the company was consolidated with Hadfields, Ltd., of England under the name of the Hadfield-Penfield Steel Co., and during the war manufactured shells and other munitions for the allied and American armies. Mr. Penfield retired as president about four years ago. Mr. Penfield was also president of the Goodyear Tire & Rubber Co., when it was founded in 1898, holding that post for seven years. He was succeeded by his brother-in-law, Frank A. Seiberling, of Akron, Ohio, who now heads the Seiberling Rubber Co. From 1903 until his retirement from business Mr. Penfield was president of the American Equipment Co., Chicago, of which he was one of the founders. Early in the century he invented the Penfield system for mechanically handling bricks during manufacture. The equipment company and the New York Brickhandling Corpn., founded by him in 1918 and headed by him until about 1928, made bricks according to this system.

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M. B. MUXEN, 50 years old, president of the Tokheim Oil Tank & Pump Co, Fort Wayne, Ind., died recently. He had been president of the company about four years, prior to which he served as vice-president and general manager. He also was chairman of the board of directors of the Kelly-Springfield Tire Co.

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WILLIAM J. LAWRENCE, president, National Steel & Copper Plate Co., Chicago, which he founded in 1903, died of apoplexy on July 10.

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FREDERICK J. GREENE, prominent industrialist of Racine, Wis., died July 6, aged 63 years. He was founder and president of the F. J. Greene Engineering Works, F. J. Greene Mfg. Co., Christensen Machine Co., and the Ideal Stitcher Co., manufacturer of stitching machines used by many of the great national magazines and publishing houses.

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RALPH F. CHATILLON, president of Foster Brothers & Chatillon, cutlery firm at Fulton, N. Y., and vice-president and director of John Chatillon & Sons, New York, manufacturers of scales, died at his home in Syracuse July 1, following a brief illness. He was 52 years old.

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J. C. MELOON, general mechanical superintendent of the General Fire Extinguisher Co., Providence, R. I., died June 20, aged 81. He entered the employ of the Providence Steam & Gas Pipe Co. April 13, 1866, and had been continuously employed by that company and its successor, the General Fire Extinguisher Co., until the day of his death. His term of service covered 66 years, two months and seven days. During that time he rose from the position of "boy" in the small machine shop of 1866 to the general superintendency of the mechanical department of a great organization. In 1926 the older employees of the General Fire Extinguisher Co. tendered Mr. Meloon a complimentary dinner in recognition of the sixtieth anniversary of his connection with the company. At that time he related how as a young man he had attended night school and later made practical application of what he learned to the problems of the shop. He designed machines which were especially built for the company's plant and obtained patents on them. One of the earliest was a tapping machine. Others were a facing machine and a multiple drilling machine. His patents, he said, extended from one for alarm bells, issued in 1881, to one for fusible links, granted in 1911.

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COL. WESTON JENKINS, assistant general manufacturing manager, Revere Copper & Brass, Inc., Rome, N. Y., died suddenly on July 9 at a tourist camp six miles west of Amsterdam, N. Y., aged 51 years. He became ill while driving from Rome to

Albany. Colonel Jenkins began his business career as a clerk with the New York Central Railroad in 1899. In 1900 he became superintendent of the Burden Iron & Steel Co., serving in that capacity until 1907, when he was made manager of the Susquehanna Iron Co. From 1911 to 1919 he served as manager of the Rome Iron Mills, Inc., and in the latter year was appointed works manager of the Rome Brass & Copper Co. Subsequent to the consolidation of the Rome Brass & Copper Co. and Revere Copper & Brass, Inc., he was made assistant manufacturing manager of the latter organization. Colonel Jenkins gained fame during the World War, when he led a detachment to the rescue of the "Lost Battalion."

Unfilled Orders Decline for Fifteenth Month

Unfilled orders of the United States Steel Corpn. as of June 30 declined 142,394 tons. This was the fifteenth consecutive decline in the corporation's unfilled business, and the total orders on hand at 2,034,768 tons is by far the lowest since the Steel Corporation has been announcing these monthly figures.

Unfilled orders at the end of each month since 1929 follow:

	1932 Tons	1931 Tons	1930 Tons
January	2,648,150	4,132,351	4,468,710
February	2,545,629	3,965,194	4,479,748
March	2,472,413	3,995,330	4,571,653
April	2,326,926	3,897,729	4,354,220
May	2,177,162	3,620,452	4,059,227
June	2,034,768	3,479,323	3,968,064
July	.....	3,407,816	4,022,055
August	.....	3,169,457	3,580,204
September	.....	3,144,833	3,424,338
October	.....	3,119,432	3,481,763
November	.....	2,933,891	3,639,636
December	.....	2,735,353	3,943,596

Live Stock Advances Buoy Up Sentiment

CHICAGO, July 12.—The recent spectacular rise in hog prices and the concomitant strengthening of the cattle market have inspired new hope in the agricultural West. Commenting on these developments, the International Harvester Co., Chicago, has released the following statement:

International Harvester officials feel that the upward movement of live stock prices in the last 30 days or so at least serves to bring the farmers much needed encouragement. There are indications of a new spirit of hopefulness in the principal live stock production sections. These advances in prices of commodities constitute an important factor in agricultural production and, if sustained and continued, should have beneficial effects on the entire agricultural situation. It is to be hoped that these price advances indicate recovery from the long depression which has been so severely felt in agriculture.

... PERSONALS ...

E. C. SMITH has been appointed chief metallurgist of the Republic Steel Corpn., Youngstown. He has been for some time assistant district manager for the Central Alloy district of the corporation at Massillon. His headquarters hereafter will be located at the main offices in Youngstown. The office of chief metallurgist is a new position that has been created by the Republic management. Mr. Smith in that capacity will not only look after metallurgical problems in connection with plant operations, but will also have direct charge over consumer metallurgical problems that arise in dealings with customers. Mr. Smith is a native of New Brighton, Pa. He was graduated from Ohio State University in 1913 and for a time did special work at the university. Then he went to the Gary works of the United States Steel Corpn., did special work at Columbia University and went back to Ohio State University as instructor. He was connected with the aircraft production office in Pittsburgh during the war. He has been with the Republic Steel Corpn. and its predecessors since 1919. He was one of the speakers at the recent spring meeting of the American Iron and Steel Institute.

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DR. WEBSTER N. JONES general superintendent, processing division, B. F. Goodrich Co., Akron, Ohio, has resigned, effective Aug. 1, to become director of engineering of the Carnegie Institute of Technology at Pittsburgh.

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IRVING H. JONES has been appointed manager of railroad sales of the Timken Steel & Tube Co., Canton, Ohio. Mr. Jones was manager of railroad sales of the Central Alloy Steel Corpn. for ten years, and for the last several years has been Western sales manager of the Molybdenum Corpn. of America, from which company he comes to the Timken organization. Mr. Jones has been active in the railroad supply industry for over 20 years and is now president of the Allied Railway Supply Association.

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H. C. RAMSEY, vice-president in charge of international business of the Worthington Pump & Machinery Corpn., Harrison, N. J., sailed for Europe on July 8 to study business conditions and visit the company's manufacturing and sales organizations in England, France, Germany, Spain and other countries.

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WALLACE T. MONTAGUE, who has been identified with the Norton Co., Worcester, Mass., for 20 years, has been made director of sales of the abrasive products division, which groups under one head the divisions handling the sale of abrasive grain, Norton floors, refractories and laboratory ware and pulpstones.

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JAMES A. FARRELL, former president of the United States Steel Corpn., has been elected a member of the board of directors of the Chamber of Commerce of the United States.

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ETHELBERT STEWART, who has been commissioner of labor statistics in the United States Department of Labor, Washington, for many years, has retired at the age of 75. He has spent 45 years in Government service, during which time he has become well known to employer and labor interests in the country.

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T. N. HOLDEN, for 15 years chief chemist and metallurgist for the E. W. Bliss Co., Brooklyn, N. Y., has become associated with the Martin Forge Co., 81 Adams Street, Brooklyn, where he will have charge of heat treating.

Steel Corporation Stock More Widely Held

The depression years have brought about a wider dispersion of the common stock of the United States Steel Corpn., together with an increase in smaller holdings at the expense of large ones. Holders of less than 10 shares increased from 59,564 in 1930 to 80,309 in 1932. In fact, there was a gain in the number of 11 classes of shareholders except those holding blocks of 1000 shares and over, who numbered 846 in 1932, compared with 1060 in 1930.

Classification of United States Steel Corporation Stockholders at Time of Closing Books for Annual Meetings in April, 1930, 1931 and 1932

Classification	1930	1931	1932
Holders of less than 10 shares of common stock.....	59,564	67,942	80,309
Holders of from 10 to 24 shares.....	32,187	39,552	57,234
Holders of from 25 to 49 shares.....	14,642	16,871	21,387
Holders of from 50 to 99 shares.....	9,203	10,806	13,293
Holders of from 100 to 999 shares.....	11,937	13,720	14,340
Holders of from 1000 and over.....	1,060	999	846
	128,594	149,891	187,409

A Change Is Inaugurated in The Iron Age Finished Steel Composite Price

WITH this issue, THE IRON AGE makes a slight change in the bases of its finished steel composite price. It now includes hot-rolled strip steel, together with the products which hitherto have been used to make up this price average, namely, steel bars, structural shapes, tank plates, wire, rails, black pipe and No. 24 gage hot-rolled annealed sheets. The eight products now forming the bases for this price average have, in recent years, represented approximately 85 per cent of the total finished steel production.

Hot-rolled strip steel has been included in the composite price in order to give a proper representation to the light flat-rolled steel products, which comprise about one-fifth of the total finished steel output. Moreover, the trend of recent years has been toward a larger proportion of these light products.

In order to give those who use THE IRON AGE finished steel composite price for statistical comparisons a record for a period of years, our monthly averages as far back as 1920 have been refigured on the new plan. These figures are appended. The composite prices for years prior to 1920 have been left undisturbed, as the light flat-rolled products had not then assumed the great importance they were later to have, the expansion of sheet and strip production having occurred largely as a result of the great development of the automobile industry beginning a decade or so ago.

The inclusion of hot-rolled strip steel in the composite price has not materially changed the general trend lines of steel prices, though there are some minor differences.

The current composite finished steel price becomes 1.976c. a lb. Under the classification previously used the figure would be 2.087c. The new figure is $2.22 a net ton lower than the one recently quoted.

From the peak price of 1920—which was the year of highest steel prices—to the lowest weekly average this year, there has been a decline of 54.4 per cent in the products represented in the new composite price. This decline has amounted to $46.02 a net ton. The decline from the peak of 1923 to the low point of this year has been $19.16 a ton or about 33 per cent, while from the peak of 1929 to the low of 1932 it was $6.82 a ton, or about 14.4 per cent.

The figures in the accompanying table are monthly averages of the weekly composite steel prices. The prices are in cents per pound at Pittsburgh and are straight averages of the published market quotations on the eight products above mentioned.

British Seek Larger Share of Canada's Steel Trade

MONTREAL, July 11. — British and Canadian steel interests were in conference here on July 4, seeking methods to promote greater inter-Empire trade. The discussions are preliminary to the Empire Economic Conference to be held at Ottawa this month. Ten prominent British industrialists are here, meeting representatives of most of the Canadian steel companies.

Efforts will be made to promote greater use here of those types of steel not manufactured in Canada, but which have in the past been imported in quantity from the United States. Differences in specifications will be another matter to be dealt with. Canadian importers, it was explained, are more accustomed to the specifications used in the United States and a modification of the specifications used in Britain might increase the market here for the British products.

A. J. Grant, head of the National Federation of Iron and Steel Manufacturers, is chairman of the British delegates, and Sir William Larke, director of the National Federation, is deputy chairman. N. Martin represented the Canadian angle of the British Steel Export Association, and C. S. Lang, vice-president in charge of sales of the Dominion Steel & Coal Co., represents his firm. Other firms represented by delegates are Algoma Steel Corpn., Steel Co. of Canada, Ltd., and Dominion Foundries & Steel Co.

Nickel-Iron Sponge Produced at Sudbury

The successful production of a nickel-iron sponge by direct process from Sudbury ore has been reported to the Natural Resources Department of the Canadian National Railways by the Canadian Government. The nickel steel production from this sponge is stated to compare favorably in physical or strength tests with nickel steels of similar S.A.E. specifications made in the ordinary way. This gives rise to the hope that there are possibilities for commercial production of nickel steel direct from the nickel-copper ores of the Sudbury district of Ontario.

The Iron Age Finished Steel Composite Prices, Monthly Averages, 1920-1932

	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
Jan.	3.202	3.087	2.052	2.494	2.81	2.521	2.429	2.365	2.224	2.286	2.231	2.032	1.937
Feb.	3.628	2.965	2.002	2.637	2.808	2.521	2.412	2.296	2.271	2.286	2.212	2.037	1.926
March	3.916	2.787	1.995	2.768	2.767	2.52	2.416	2.302	2.273	2.286	2.215	2.032	1.939
April	4.08	2.74	2.063	2.87	2.696	2.465	2.421	2.296	2.27	2.317	2.158	2.024	1.97
May	4.015	2.762	2.123	2.856	2.647	2.427	2.401	2.296	2.249	2.317	2.124	2.012	1.97
June	3.974	2.64	2.18	2.852	2.596	2.41	2.405	2.304	2.236	2.317	2.11	2.008	1.971
July	4.087	2.523	2.211	2.832	2.555	2.405	2.415	2.302	2.222	2.317	2.079	2.024	....
Aug.	4.171	2.346	2.325	2.802	2.494	2.39	2.415	2.302	2.242	2.307	2.062	2.014	....
Sept.	4.165	2.239	2.461	2.802	2.457	2.372	2.39	2.293	2.242	2.301	2.053	2.014	....
Oct.	3.987	2.206	2.516	2.802	2.437	2.382	2.399	2.246	2.263	2.28	2.038	2.013	....
Nov.	3.717	2.131	2.49	2.802	2.452	2.416	2.399	2.216	2.274	2.273	2.035	2.008	....
Dec.	3.18	2.094	2.471	2.786	2.504	2.431	2.399	2.217	2.281	2.273	2.021	1.978	....
Average.	*3.843*	*2.543*	*2.241*	*2.775*	*2.602*	*2.438*	*2.408*	*2.286*	*2.254*	*2.297*	*2.111*	*2.016*	*1.919*

• • EDITORIAL COMMENT • •

Fiddling While Rome Burns

THE failure of American security markets to show a decided response to the Lausanne reparations agreement and the successful launching of the British debt conversion plan—both of them international events of far-reaching significance—can only be explained by unrelieved fears of unwise legislation by Congress. Confidence, which is prerequisite to the loosening of credit and the release of enterprise, cannot be restored so long as there is risk of unsound fiscal experimentation.

In fact, the chief cause of uncertainty since the first of the year has been the long delay of Congress in coming to grips with the budget problem and its equal indecisiveness in dealing with currency inflation proposals and tax-eating relief measures. Fear of what Congress might do was mainly responsible for converting the Federal Reserve credit expansion policy into a defensive program. In other words, a large part of the credit created by the Federal Reserve banks had to be used to offset foreign gold withdrawals which were prompted by distrust of Congress. Happily, gold exports have finally subsided, but only because the Bank of France and other European central banks have virtually exhausted their short-term balances in this country.

Domestic fear of Congressional ineptitude remains with us. So long as our legislators threaten to incur immense new Governmental obligations under the guise of a relief bill or to upset the very value of our money through inflationary experiments, capital will stay in hiding. It is false reasoning to contend that the Government must appropriate and lend because private capital is not functioning. It is precisely because Congress is still flirting with unsound fiscal proposals that capital remains immobile.

But our politicians on capitol hill are more interested in accumulating ammunition for the Presidential campaign than in working for the economic recovery of the country. They are setting up straw men and knocking them down to impress the gallery. They are passing bills with the foreknowledge that they will be vetoed merely so that they can claim to have championed the causes of special self-seeking groups. Like Nero, who fiddled while Rome burned, our politicians are prolonging their own little private game while confidence languishes and the depression deepens.

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Quality Chiseling

METICULOUS inspection of a degree beyond that which would normally be exercised for the acceptance or rejection of purchased materials or products is not in order today. There are enough handicaps imposed upon the doing of present-day business. Nor should we condone the conduct of the small minority of buyers who succumb to opportunism and drive the price cutting chisel with the heavy hammer of unwarranted rejections.

However, as usual, there are two sides to the story. The great majority of purchasing executives, as pointed out by G. A. Renard, secretary-treasurer of the N.A.P.A., desire, as do most of us, to be as helpful as possible to industry at large during these trying times. Some of them find this attitude imposed upon by suppliers who quote low prices with the intention of furnishing off-quality or substandard material and with the hope that it will "get by" a charitably-minded receiving inspector.

Quality chiseling, of this sort, is just as bad, or perhaps worse, than price chiseling on the part of a buyer. It penalizes all honest suppliers and imposes upon all honest buyers.

Thanks to intelligent specification practice and an able body of buyers, American industry has been able to maintain high quality standards. We must not let the present pressure crash the gates and admit shoddy goods.

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Who Is to Be "Relieved"?

THE Garner-Wagner "relief" bill is supposedly aimed to relieve unemployment in this country. As originally drawn, however, it was more likely to create additional employment abroad than at home, for no provision was included restricting public works projects to the use of American materials. In view of the ruinous price levels at which foreign steel and other materials are being dumped in this country, this oversight might have been serious, for contractors would have been free to buy materials abroad at an added profit to themselves and to the detriment of American labor.

Fortunately, as noted elsewhere in this issue, the oversight has been corrected by Senator Reed who has introduced an amendment to the bill correcting the situation.

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A Different Way of Restoring Equilibrium

IT must be a shock to those economists who urge deflation to the bitter end to note that the prices of certain raw materials are rising. The orthodox way of restoring price equilibrium, according to their arguments, is to have all prices sink to the level of the most sharply deflated commodities. It had not occurred to them, apparently, that the gap between the prices of manufactured products and the prices of raw materials may be closed by a lifting up from the bottom rather than by a further recession from the top.

Yet in the past month hog prices have risen 60 per cent and raw sugar has advanced 50 per cent. Moreover, cattle prices are improving. Wheat has not yet fallen in line, although many believe that it will soon show signs of gathering strength. The accumulations of the Grain Stabilization Corporation, which amounted to 329,641,000 bushels on June 30, 1931, have been reduced to negligible proportions, now amounting to only 28,000,000 bushels. In addition, the winter wheat crop is far short of that of a year ago and the prospects are that the country's total supply, including the spring wheat harvest and the carryover from last year, will be about 143,000,000 bushels less than a year ago.

Steel Ingot Production in June at New Low Figure

Daily Output Drops to 34,511 Tons, or Rate of 15.96 Per Cent of Adjusted Capacity of Industry

PRODUCTION of open-hearth and Bessemer steel ingots in June, as reported by the American Iron and Steel Institute, fell to the surprisingly low figure of 34,511 gross tons a day, compared with a daily rate in May of 42,540 tons. The calculated output for all companies, based on reports from those which made 95.33 per cent of the open-hearth and Bessemer ingots last year, was 897,295 gross tons, against 1,106,030 tons in May.

The percentage of output to the present capacity of the steel industry for June is estimated by the institute at 15.96, percentage figures for all of this year having been adjusted to the new capacity figure of 67,473,630 gross tons for open-hearth and Bessemer steel, as of Dec. 31, 1931. The May percentage rate has been adjusted to 19.67.

The June daily output fell below the low figure of 1921, which was 36,713 tons in July and also below the 34,617 tons a day produced in January, 1908, which was the low for that year, and, in fact, is actually the lowest since January, 1904, when the daily output was 29,186 tons.

In all probability the steel industry has never operated at such a low percentage rate as in June. The January, 1904, low point was equivalent to about 36 per cent of the then existing capacity of 24,963,700 gross tons of open-hearth and Bessemer ingots, while the January, 1908, low was about 32 per cent of the 33,845,100 gross tons of open-hearth and Bessemer capacity of that year.

In the first half of 1932 only 7,567,769 gross tons of ingots was produced, compared with 15,559,860 tons in the corresponding period of 1931. This is the smallest total for a first half since 1908, when 5,944,000 tons was produced. Output in the first half of 1921 was 10,290,000 tons.

The table below gives adjusted figures for 1932 and 1931, as announced by the American Iron and Steel Institute, together with revised percentage rates of production.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)
Reported by Companies Which Made 95.33 Per Cent of 1930 Ingots

1931	Open-Hearth	Bessemer	Calculated Output All Companies: Monthly	Calculated Output All Companies: Daily	No. of Working Days	Per Cent Operation
January	2,088,175*	296,620	2,512,140**	93,042**	27	43.80**
February	2,131,079*	296,974	2,547,027**	106,126**	24	49.96**
March	2,565,531*	346,137	3,054,329**	117,475**	26	55.30**
April	2,321,042*	316,668	2,766,959**	106,421**	26	50.09**
May	2,130,805*	301,639	2,551,632**	98,140**	26	46.20**
June	1,782,007*	246,365	2,127,762**	81,837**	26	38.52**
Six Months	13,028,640*	1,804,403	15,559,860**	100,386**	155	47.25**
July	1,574,379*	225,030	1,887,580**	72,599**	26	34.17**
August	1,462,254*	174,380	1,716,829**	66,032**	26	31.08**
September	1,274,672*	199,151	1,545,411**	59,439**	26	27.98**
October	1,318,958*	195,945	1,590,180**	58,896**	27	27.72**
November	1,276,856*	240,441	1,591,644**	63,666**	25	29.97**
December	1,068,384*	172,046*	1,301,211**	50,047**	26	23.56**
Total	21,004,543*	3,011,394*	25,192,715**	81,006**	311	38.13**

*Revised. **Adjusted.
The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1930, of 66,069,570 gross tons for Bessemer and open-hearth steel ingots.

Reported for 1932 by Companies Which Made 95.33 Per Cent of the Open-Hearth and Bessemer Steel Ingot Production in 1931

1932	Open-Hearth	Bessemer	Calculated Output All Companies: Monthly	Calculated Output All Companies: Daily	No. of Working Days	Per Cent Operation
January	1,230,661	160,633	1,459,450*	56,133*	26	25.36*
February	1,232,568	157,067	1,457,710*	58,308*	25	26.96*
March	1,149,307	193,944	1,409,054*	52,187*	27	24.13*
April	1,036,227	144,197	1,238,250*	47,625*	26	22.02*
May	950,785	103,593	1,106,030*	42,540*	26	19.67*
June	755,123	100,249	897,275	34,511	26	15.96
Six Months	6,354,671	859,683	7,567,769	48,511	156	22.43

*Revised.
The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1931, of 67,473,630 gross tons for Bessemer and open-hearth steel ingots.

Babcock & Wilcox Co. Gets Hoover Dam Job

WASHINGTON, July 12.—The Bureau of Reclamation has awarded to the Babcock & Wilcox Co., 85 Liberty Street, New York, a contract for outlet pipes for the Hoover Dam which will require 46,200 tons of plates and shapes, which will be shipped direct to Bechtel, Nev., near the dam, where the Babcock & Wilcox company will erect a fabricating plant to handle this work. Plates and shapes will be supplied by the Illinois Steel Co. from its Gary, Ind., plant. The plates will range up to 2 13/16 in. in thickness. The Babcock & Wilcox company will also fabricate 420 tons of pipe sections at its Barberton, Ohio, plant. This pipe will have a maximum diameter of 30 ft. and a minimum of 25 ft.

The award of the contract to the Babcock & Wilcox Co. was delayed because of a claim made by the A. O. Smith Corpn., Milwaukee, that the Babcock & Wilcox company in its welding operations on this job contemplated an infringement of the welding patent of the Smith corporation. This allegation necessitated a hearing by Secretary of Interior Wilbur before the contract was awarded.

Hoover Dam to Require 17 Large Turbines

WASHINGTON, July 12.—Tentative plans for power plant installation at Hoover Dam, Boulder City, Nev., provide for 17 turbines, two to be 55,000 hp. and 15 to be 115,000 hp., the latter larger than any built so far as known. It is expected that the Bureau of Reclamation will advertise this fall, perhaps in September, for four turbines of 115,000 hp. each and two of 55,000 hp. each.

Railroad Equipment

United States Navy Department is inquiring for three 50-ton flat cars, one 50-ton box car and one 30-ton flat car; three flat cars and one box car are for delivery at Sunnyvale, Cal., and one flat car at Puget Sound.

Los Angeles County Board of Supervisors will open bids on July 18 for 235 long tons of No. 1 relaying rails and 10 tons of bolts, nuts and spikes for flood control trackage on the Los Angeles River.

Steel Ingot Production Recovers to the Average of June

Rate This Week Estimated at 16 Per Cent, Some Plants Having Resumed—Automobile Orders Tapering Off

WITH the resumption of some steel plants that were shut down during the holiday week, ingot production has had a moderate rebound to 16 per cent of the country's capacity, a return to the average of June. During the period of partial idleness there has been scarcely any accumulation of backlogs, and steel mills are subsisting on small, day-to-day orders which are restricted in part by seasonal dullness, marked by many complete shutdowns of steel-consuming plants. Some of these plants will resume late this month or in August, but thus far they have made no provision for the materials they will require.

It becomes more apparent that the steel and allied metal-working industries must look first for constructive developments outside their own immediate province for the stimulation of confidence necessary to recovery. A degree of stability in commodity prices and the sustained advances in livestock values, with the prospect that this improvement may extend to other agricultural products, has raised hopes that the farm, the longest and most serious sufferer from depression, may lead the way out, as has happened in previous economic crises. The effects upon business of the Lausanne agreement on reparations and the expected early adjournment of Congress cannot yet be measured, though these occurrences are expected to provide a groundwork for some measure of improvement.

THE steel industry cannot yet see signs of much change before late August or early September, and hopes of a pick-up by that time are based on somewhat nebulous grounds. There is, of course, the almost certain prospect that the Government relief bill, as finally passed by Congress, will call for considerable tonnages of steel for authorized construction work, and there is also a more definite feeling in the industry that some purchases of rails will be required for laying by the railroads before cold weather, the recent release of 20,000 tons by the Pennsylvania tending to strengthen this viewpoint. Moreover, the number of bad order freight cars is increasing, which points to the need of repair programs when the railroads can finance them.

Construction work has been furnishing most of the large steel tonnages of late, but the volume of lettings has shrunk this month, excepting the placing of a Government contract for the Hoover Dam, which calls for 46,200 tons of plates and shapes, to be rolled by a Chicago mill, but the work will be spread out over two or three years. Two large projects which may come into the market next month are 22,000 tons for grade elimination work by the Long Island Railroad at Far Rockaway, L. I., and 16,000 tons for additional West Side improvements in New York by the New York Central Railroad. Fabricated structural steel awards in the week were only 9800 tons.

The automobile industry's steel requirements will be smaller during the remainder of the summer at least, and a dropping off in orders from that source is now being experienced. New models in the light car field may afford some stimulation later on, but the present situation is that Ford production is gradually declining and will range from 80,000 to 85,000 this month and not more than 70,000 in August, while the July total for the entire industry may not exceed 160,000, against 190,600 for June.

A DECLINE of almost 19 per cent in the daily production of steel ingots in June to a rate of barely 15.96 per cent of the present estimated capacity, together with the fifteenth consecutive drop in the unfilled tonnage of the United States Steel Corpn., emphasizes the extreme deflation of the steel industry. The ingot output was the smallest for any month since January, 1904, and on a yearly basis is almost down to the level of 1900.

Foreign competition in steel has become so serious, in the opinion of the National Association of Flat Rolled Steel Manufacturers, that Congress should declare an embargo. The remedy is believed by influential members of Congress to lie in invoking the anti-dumping provision of the tariff act. Meanwhile, a considerable portion of the steel industry in Belgium, which has been the principal shipper of steel to the United States, is demoralized as the result of a strike of coal miners. Practically all of the Charleroi district is shut down.

A CHANGE has been made this week in the bases of THE IRON AGE finished steel composite price (see p. 78) by the inclusion of hot-rolled strip steel. Thus, the composite price becomes 1.976c. a lb., whereas under the former practice it would be 2.087c. The composite prices for pig iron and steel scrap are unchanged at $13.76 for the former and $6.42 for the latter.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	July 12, 1932	July 5, 1932	June 14, 1932	July 14, 1931
Per Gross Ton:				
No. 2 fdy., Philadelphia	$14.34	$14.34	$14.84	$17.01
No. 2, Valley furnace	14.50	14.50	14.50	17.00
No. 2 Southern, Cin'ti	13.82	13.82	13.82	14.69
No. 2, Birmingham	11.00	11.00	11.00	12.00
No. 2 foundry, Chicago*	15.50	15.50	16.00	17.50
Basic, del'd eastern Pa.	15.50	15.50	16.00	16.75
Basic, Valley furnace	13.50	13.50	14.00	15.50
Valley Bessemer, del'd P'gh	16.89	16.89	16.89	18.76
Malleable, Chicago*	15.50	15.50	16.00	17.50
Malleable, Valley	14.50	14.50	15.00	17.00
L. S. charcoal, Chicago	23.17	23.17	23.17	25.04
Ferromanganese, seab'd carlots	68.00	68.00	68.00	85.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	32.00	32.00	32.00	34.00
Rerolling billets, Pittsburgh	26.00	26.00	27.00	29.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	29.00
Slabs, Pittsburgh	26.00	26.00	27.00	29.00
Forging billets, Pittsburgh	33.00	33.00	33.00	35.00
Wire rods, Pittsburgh	37.00	37.00	37.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.65

Finished Steel

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.60	1.60	1.60	1.65
Bars, Chicago	1.70	1.70	1.70	1.70
Bars, Cleveland	1.65	1.65	1.65	1.65
Bars, New York	1.95	1.95	1.95	1.98
Tank plates, Pittsburgh	1.60	1.60	1.60	1.65
Tank plates, Chicago	1.70	1.70	1.70	1.70
Tank plates, New York	1.898	1.898	1.898	1.93
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.65
Structural shapes, Chicago	1.70	1.70	1.70	1.70
Structural shapes, New York	1.86775	1.86775	1.86775	1.90½
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	2.10
Hot-rolled strips, Pittsburgh	1.45	1.45	1.40	1.55
Cold-rolled strips, Pittsburgh	2.00	2.00	2.00	2.15

Finished Steel

	July 12, 1932	July 5, 1932	June 14, 1932	July 14, 1931
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Hot-ro'led annealed sheets, No. 24, Pittsburgh	2.20	2.20	2.20	2.40
Hot-ro'led annealed sheets, No. 24, Chicago dist. mill	2.30	2.30	2.30	2.50
Sheets, galv., No. 24, P'gh	2.85	2.85	2.85	2.90
Sheets, galv., No. 24, Chicago dist. mill	2.95	2.95	2.95	3.00
Hot-rolled sheets, No. 10, P'gh	1.55	1.55	1.55	1.70
Hot-rolled sheets, No. 10, Chicago dist. mill	1.65	1.65	1.65	1.80
Wire nails, Pittsburgh	1.95	1.95	1.95	1.80
Wire nails, Chicago dist. mill	2.00	2.00	2.00	1.85
Plain wire, Pittsburgh	2.20	2.20	2.20	2.20
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.25
Barbed wire, galv., P'gh	2.60	2.60	2.60	2.55
Barbed wire, galv., Chicago dist. mill	2.65	2.65	2.65	2.60
Tin plate, 100 lb. box, P'gh	$4.75	$4.75	$4.75	$5.00

Old Material

Per Gross Ton:				
Heavy melting steel, P'gh	$8.25	$8.25	$9.00	$10.50
Heavy melting steel, Phila.	6.25	6.25	6.25	8.25
Heavy melting steel, Ch'go	4.75	4.75	5.75	8.75
Carwheels, Chicago	5.50	5.50	5.50	10.00
Carwheels, Philadelphia	8.00	8.00	8.00	12.00
No. 1 cast, Pittsburgh	9.50	9.00	9.00	10.50
No. 1 cast, Philadelphia	8.00	8.00	8.00	11.50
No. 1 cast, Ch'go (net ton)	6.00	6.00	6.00	9.00
No. 1 RR. wrot., Phila.	8.50	8.50	8.50	10.00
No. 1 RR. wrot., Ch'go (net)	3.75	3.75	3.75	7.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$2.00	$2.00	$2.00	$2.40
Foundry coke, prompt	3.00	3.00	3.00	3.50

Metals

	July 12, 1932	July 5, 1932	June 14, 1932	July 14, 1931
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	5.50	5.50	5.50	8.12½
Electrolytic copper, refinery	5.12½	5.12½	5.12½	7.50
Tin (Straits), New York	21.12½	20.37½	19.00	24.62½
Zinc, East St. Louis	2.60	2.67½	2.80	3.90
Zinc, New York	2.97	3.04½	3.17	4.25
Lead, St. Louis	2.55	2.60	2.90	4.22½
Lead, New York	2.70	2.75	3.00	4.40
Antimony (Asiatic), N. Y.	5.00	5.00	5.12½	6.90

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
July 12, 1932	1.976c. a Lb.	$13.76 a Gross Ton	$6.42 a Gross Ton
One week ago	1.976c.	13.76	6.42
One month ago	1.97c.	14.01	7.00
One year ago	2.033c.	15.56	9.17
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products make 85 per cent of the United States output.	Based on average of basic iror at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1932	1.976c., June 28;	1.926c., Feb. 2	$14.81, Jan. 5;	$13.76, July 5	$8.50, Jan. 12;	$6.42, July 5
1931	2.037c., Jan. 13;	1.945c., Dec. 29	15.90, Jan. 6;	14.79, Dec. 15	11.33, Jan. 6;	8.50, Dec. 29
1930	2.273c., Jan. 7;	2.018c., Dec. 9	18.21, Jan. 7;	15.90, Dec. 16	15.00, Feb. 18;	11.25, Dec. 9
1929	2.317c., April 2;	2.273c., Oct. 29	18.71, May 14;	18.21, Dec. 17	17.58, Jan. 29;	14.08, Dec. 3
1928	2.286c., Dec. 11;	2.217c., July 17	18.59, Nov. 27;	17.04, July 24	16.50, Dec. 31;	13.08, July 2
1927	2.402c., Jan. 4;	2.212c., Nov. 1	19.71, Jan. 4;	17.54, Nov. 1	15.25, Jan. 11;	13.08, Nov. 22

*With this issue, the bases for THE IRON AGE finished steel composite prices are changed slightly. For explanation and record of past years see page 78.

Pittsburgh and Nearby Districts at Pre-Holiday Production Rates

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PITTSBURGH, July 12.—With most of the plants which suspended production over the holiday week again in operation, the local steel industry has assumed the status of the end of June. While production was low last week, specifications were also light and mills accumulated no backlogs to enable them to expand output now that consumers have again begun to take out their usual small lots.

The principal consuming industries show little change in the size and character of their needs. The automobile group continues to take sheets and strip steel at a fair rate, even though a large percentage of current movement is going to the Ford Motor Co.

Railroads sh w no disposition to come into the market, although release of rails by the Pennsylvania last week indicates that the carriers as a group are rapidly approaching the day when they must begin placing more orders for maintenance requirements. Steel shipments to the oil industry are holding rather steadily, but show definite improvement only in a demand for sheets for steel barrels. Fabricated structural steel awards are lighter, but a considerable amount of Government is still to be placed, and shipments against orders taken in the spring will keep some fabricators busy during the summer and early fall. Reinforcing bar business is rather disappointing, with demand coming principally from State highway projects.

Steel ingot production in the Pittsburgh district has risen to about 12 per cent of capacity, or approximately the level which prevailed at the close of June. A 15 per cent rate has been reached in the Valleys, and the Wheeling district is again running at about 30 per cent, with one or two mills in that district running at an even higher figure. Blast furnace activity is essentially unchanged, as most of the banked stacks in Pittsburgh and nearby districts have again begun to produce iron in a limited way.

Finishing mill schedules are very irregular, particularly in the flat rolled industry. Sheet production this week is at nearly 20 per cent of capacity, and tin mills are again running at about 50 per cent, even though some material is still stocked. In the other finishing departments, production averages from 10 to 15 per cent, being influenced to a large extent by alternating weekly schedules.

Steel ingot output at 12 per cent in Pittsburgh district, 15 per cent in Valleys and 30 per cent at Wheeling.

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No backlogs accumulated during holiday shutdowns, and conditions revert to status at end of June.

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Steel prices as a whole are being satisfactorily maintained.

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Steel prices as a whole are being satisfactorily maintained, and little consumer opposition to current levels is being encountered. Weakness persists in tin plate, but no change in the official price is likely to be made before fall, when the figure for the coming year is ordinarily announced. On cold-finished steel bars and hot-rolled strip, on which new base prices were put into effect for the third quarter, old contracts are rapidly being taken out, and full establishment of the new price schedules is expected by the end of July. Raw material prices are still weak, although no open declines have been reported in the last week.

Pig Iron

Sales are almost entirely lacking, and purchases reported generally call for no more than carloads. Shipments against contracts are light, reflecting the very low schedules of foundries. Prices are well maintained on current transactions, although the quoted figure on basic iron is strictly nominal. The $13.50, Valley furnace, price, and the $14, Pittsburgh, quotations have not been established by actual sales, but are fairly representative of the levels at which producers would be willing to sell small and moderate-sized lots.

Semi-Finished Steel

Shipments are light, reflecting the low rate of operations of non-integrated sheet and strip producers. Prospects for the remainder of the month are poor. Some consumers are suspending operations rather frequently for lengthening periods. Prices are well maintained at $26, Pittsburgh. Shipments of forging billets are holding their own, but wire rods are very quiet.

Rails and Track Accessories

Release of 20,000 tons of rails by the Pennsylvania last week is expected to complete this carrier's requirements for the year, and no additional purchases will be made. These rails will be delivered during August, but no plans for immediate laying have been made. As a result, accessories to go with release may not come out for some time and are not expected to involve very much tonnage. The local rail mill will probably roll its share of the tonnage early in August. No other business of importance has appeared, and releases of accessories are generally very light.

Bars, Plates and Shapes

Tonnage in heavy hot-rolled products so far this month has fallen under June levels, but sentiment is improved by the prospect of heavier fabricated structural lettings in the late summer. Some authorized Government work still remains to be placed, but new projects now being authorized by Congress will require several months of preliminary work before fabricators are asked to quote on them. Reinforcing bar jobs are not as numerous as they were, and State highway work predominates. A New Orleans cotton broker has purchased five barges, requiring 1000 tons of plates, from a Southern builder. An additional 1000 tons of plates and shapes will be required for a dam and lock gates in the Kanawha River at Marmet, W. Va. Some improvement in demand for plates from tank fabricators has been expected, but has not yet materialized to any extent. Merchant bars are very dull, and movement of alloy bars to the automobile industry still seems to be declining. Heavy hot-rolled steel prices are well maintained, and the beginning of the new quarter finds comparatively more contract business on producers' books at the full schedules than has been the case for some time.

Cold-Finished Steel Bars

Although demand continues very light, makers of cold-finished steel bars and shafting are encouraged by the improved price structure which is now generally effective on new business. Shipments against old contracts will be completed by the end of the month.

Tubular Goods

Movement of tubular goods in general is being maintained at about the same rate as in June, and oil country

goods still show a tendency to expand. Prospects for line pipe are not very bright, and no definite inquiries of size are before the trade. Two or three indefinite inquiries for which the prospective buyer wishes to establish credit arrangements have been out for some time, but have made little progress. One of these calls for 200 miles of 12-in. pipe. Standard pipe shows no change, although demand may benefit from Government projects later in the year.

Wire Products

The wire market is still living on prospects, and current demand is barely holding its own at 10 to 15 per cent of the industry's capacity. Manufacturers' wire is particularly sluggish, and spring wire is quiet in view of the low activity among bed makers and furniture manufacturers. Merchant wire products show little change, although jobbers' stocks are so low, but improved buying may be expected as soon as there is an upturn in consumer demand. Prices are holding satisfactorily.

Sheets

Demand from miscellaneous consumers has not offset loss of tonnage from the automobile industry, but Ford releases have been heavy in the last week, and mills are maintaining a somewhat higher production level. Current schedules range from 18 to 20 per cent of capacity, with full finishing units engaged at the best rate. Some producers have also had heavier specifications for galvanized sheets, although sustained demand for galvanized material is still lacking. Makers of steel barrels and drums seem to be taking more tonnage than they were last month, reflecting the expanding activity of the oil industry.

The process of adjusting sheet prices to current quoted levels has now been largely completed, and mills have entered the third quarter with little business on their books at lower levels. Buyers are expressing little opposition to current quotations, and the price structure is not deterring any purchases.

Tin Plate

Production has again been stepped up to the 50 per cent level which prevailed before the holiday week. One or two large producers are still stocking material, but shipments generally are somewhat heavier than production. The large container manufacturers are specifying in a restricted manner, and crop reports in some parts of the country are bearish. Credit difficulties will also cut down the vegetable and fruit packs to some extent. A nearby mill is reported to have taken 25,000 boxes from the Gold Gust Corpn.

Strip Steel

Local producers of hot-rolled strip are getting little tonnage from the automobile industry, as many of their principal outlets are preparing to bring out new models late in the summer, and already have curtailed production sharply. Demand from other sources is very dull, but the industry has been able to maintain operations at about the same level which prevailed before the holiday. Prices show little variation from the quoted levels on both hot and cold-rolled strip. Full establishment of the single base price of 1.45c., Pittsburgh, on all grades of hot-rolled strip will be realized gradually, and is now effective among a large percentage of consumers.

Coke and Coal

Business has shown no activity this month, and shipments of foundry coke are barely holding at the June levels. Furnace grade is even more quiet, and prices range from $2 to $2.15, Connellsville. Industrial consumption of coal has been especially light because of so many plant suspensions since the beginning of the month. Railroad consumption shows little change.

Scrap

The heavy melting steel in the recent Pennsylvania Railroad list is reported to have been bought by dealers at more than $8, and will likely be shipped to a nearby consumer at at least $8.50. This transaction confirms the current price range of $8 to $8.50 on this grade of scrap. On the other grades, quotations are largely nominal, although cast scrap continues strong. Heavy breakable is quoted at the same price as steel, and No. 1 cast has been bid up to $10 by certain foundries which are using a larger percentage of this grade in their melt. Machine shop turnings are weaker in the absence of a definite market, and the blast furnace grades generally lack a shipping point.

Valley Steel Output Gains to About 15 Per Cent This Week

YOUNGSTOWN, July 12.—Valley steel makers believe that production probably reached the low point of the summer last week, but there is little prospect of sustained improvement this month. August will be watched with much interest, as the trend of demand in that month is expected to throw considerable light on activity throughout the remainder of the year. Producers in this territory have made all possible economies to reduce their losses during the summer, and the fact that they are prepared to take immediate advantage of any improvement in finished steel consumption has made for improved sentiment.

With steel ingot production suspended in most plants during the early part of last week, production in the period averaged well under 10 per cent of capacity. Since that time a number of plants have resumed activity and operations in Valley and northern Ohio plants outside of the Cleveland district will average about 15 per cent this week. Finishing mill schedules will also regain some of the ground lost in the holiday week, even though specifications accumulated in the last few days have not been sufficient to prompt any noticeable spurt in production. Resumption of the Hubbard, Ohio, blast furnace to supply iron to the nearby ingot mold plant has given temporary impetus to pig iron output. The plant will probably continue for about a month.

Demand for sheets, strip steel and bars from the automobile industry is still declining, although the requirements of the Ford Motor Co. are still sustained. The other outlets for sheets and strip show no improvement and are only sufficient to provide rolling schedules for a few turns each week. Many plants are operating for a few days every other week and average production of flat-rolled steel, with the exception of tin plate, is no higher than 15 per cent. Tin mill schedules are also lower, although the large Steel Corporation units in the district have resumed production at about 50 per cent after a week's idleness. The leading independent plant is not doing as well.

Sustained though limited demand for tubular goods has been one of the bright spots of the market in recent weeks and gives promise of acceleration rather than contraction over the next two months. This is particularly true in the case of oil country goods. Sizable line pipe projects are lacking and butt-weld pipe movement is very light. Demand for plates is also quiet, as the principal outlets are doing very little. Wire products are seasonably dull, but reports from the Northwest are very encouraging and better movement is expected as soon as the crop harvests are completed.

The raw materials markets reflect the dullness of finished steel. Pig iron is moving only in carload lots, but prices are fairly well sustained at $14.50, Valley furnace, for foundry and malleable iron and $15 for Bessemer. The basic price is strictly nominal in the absence of sales and is quoted at $13.50 entirely upon the knowledge that large producers are willing to sell even small lots at that level. Inquiry for a large tonnage would undoubtedly bring out a lower figure. Scrap is moving to a few plants, but no recent sales have been made to establish a quotable market.

Chicago Ingot Production Rate Rises Slightly After Holiday Recession

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Chicago ingot rate rises to 14 per cent after holiday-week recession.

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Pig iron prices are firm at recently established lower levels.

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Scrap market still extremely weak and distress tonnages are sold at sacrifice prices.

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CHICAGO, July 12.—The local iron and steel market has all of the general characteristics of summer trade. Some quickening in inquiries for finished steel points to consumers' study of future trends, which they evidently now believe may be upward. However, new buying is small.

Both Chicago rail mills are operating with about a three weeks' schedule at present rate of rolling. Once again there is heard the opinion that some railroads will soon be in need of emergency rail tonnages for delivery before cold weather.

Ingot output has climbed to about 14 per cent of capacity following a rate four to five points lower over the holiday week.

Prices, excepting scrap, present a fair degree of firmness, but as is usual in a market of this kind are not being given real tests. Most transactions in scrap are of distress tonnages and prices vary according to the urgency for unloading. The extremely low prices brought out by trades of this character is fixing the notion of broader speculation in the minds of dealers. The continued upward movement of cattle and hog prices is definitely improving sentiment in the Central West and manufacturers are giving close attention to these markets.

Pig Iron

Quotations on Northern foundry iron are firm at $15.50 a ton, local furnace, as the $16 price gradually disappears from the market. New buying is spotty and in small lots and there is no indication that interest in future needs is of concern to consumers. Sales of both Southern and charcoal iron are extremely light. Shipments so far in July are slightly less than the average in the preceding month.

Wire Products

Shipments of these commodities are lighter and sellers do not look for improvement until late in August. One large group of salesmen will return to their territories at the end of the week. Mill stocks are well rounded, but lighter than usual at this time of year, and operations have been scaled down to a range from 20 to 25 per cent of capacity. Advances in hog and cattle prices raise a note of encouragement in rural areas, but other farm commodities continue to bring low prices. Spot purchases of wire and wire products are light. Contracting is still an important phase of the market.

Cold-Rolled Strips

Output is holding well at 17 per cent of capacity. However, tendencies in the automobile trade foretell lower production in the near future.

Warehouse Business

Orders are very light, and from present indications July shipments will fall behind those of June. Warehousemen look for no improvement in August, but mid-summer is usually a dull period. Improvement often starts in September, with October one of the three best months of the year.

Bars

This market is still thin and the outlook is not encouraging. Automobile manufacture continues to taper, and it is heard here that Ford is to lower its schedule in August. A number of makers, among them Hupp, Hudson and Overland, are said to be planning new low-priced cars. Hog and cattle raisers are feeling better as the result of price advances, but grain and general produce raisers are still under the pressure of low prices, and as a consequence farm implement manufacturers are still uncertain about the outlook for fall manufacturing schedules. Rail steel bar mills are operating at close to 20 per cent of capacity. Schedules are irregular, especially since the recent drop in demand from porch and lawn furniture manufacturers.

Cast Iron Pipe

This market has turned very quiet, though sellers are still hopeful that improvement will develop before the end of the summer. Sheboygan, Wis., is expected to take prices on a fair tonnage some time in August. American Cast Iron Pipe Co. is low bidder on 1200 tons at Ann Arbor, Mich.

Plates

A Chicago fabricator has booked 2000 tons of plates for the Phillips Petroleum Co. The 42,600 tons of plates and shapes for the Hoover Dam has been placed, and it is understood that the steel will be rolled by Chicago mills. The Burlington has recalled 650 shop men and the Great Northern has added 1500 to payrolls.

Sheets

Demand remains very light and irregular, and output is not over 15 per cent of capacity.

Rails and Track Supplies

Chicago rail mill schedules are based entirely on the recent release by the Pennsylvania, and present rate of rolling will be maintained for the next two or three weeks.

Structural Material

Structural awards total 7000 tons, but fresh inquiries are in small tonnage. A Wisconsin fabricator is in line for the 5000 tons for the Minneapolis Post Office. An injunction has stopped progress on the municipal auditorium at St. Louis. The Burlington may appeal its motion for an injunction to halt construction of a dam at Alma, Wis.

Reinforcing Bars

Prices for this commodity are stable in a market which gains most of its support from public work. An order has been placed for 225 tons for a bridge in Illinois, and Indiana is to open bids soon on 500 tons for road work. Shipments of bars for road work appear to have passed the peak for the current season.

Bolts, Nuts and Rivets

This market is extremely dull, with shipments so far in July below the June average. Most bolt and nut plants are calling men to work only as orders are received and cannot be supplied from stocks.

Scrap

An air of speculation is gripping dealers, who find scrap available at almost any price. Turnings and borings are being accumulated on local docks and a few special grades are being put in yards. It is not likely, however, that this movement will be of great size because of the credit situation. Only one steel mill in this district is accepting shipments of heavy melting steel.

New York Steel Demand Is Below the Level of June

Two Large Structural Steel Projects, One of 22,000 Tons and Another of 16,000 Tons, Expected Next Month

NEW YORK, July 12.—No appreciable change has occurred either in the volume or the character of steel demand thus far in July. For most steel companies represented in this district, the volume of sales is below that of June. Such orders as are coming in are small and for immediate requirements. Companies whose plants are shut down during part or all of July are not yet making provision for the materials that may be needed when they resume.

Prospective business includes two large structural steel projects. Grade elimination work at Far Rockaway, L. I., by the Long Island Railroad, will require about 22,000 tons, on which bids will be requested probably in August. At about the same time the New York Central will inquire for about 16,000 tons of fabricated material for additional West Side highway work. Bids have gone in on 3200 tons of pipe to be used in the foundation of the new Federal Court House in New York. The George J. Atwell Foundation Corpn., the general contractor, will buy the pipe.

Pig Iron

With foundry operations at the low point for this year, inquiry for pig iron is exceedingly light. Although August will undoubtedly bring an increase in melt, buyers are not disposed to anticipate their needs, preferring to defer purchasing until replenishment of stocks is imperative. Sales volume in this district continues to be small, with bookings in the past week totaling barely 1000 tons, compared with 1300 tons the week before and 1000 tons two weeks ago. Pressure of foreign competition along the seaboard has caused weakness in the price of eastern Pennsylvania iron, which is now quotable at $13.50 to $14, furnace. Buffalo furnaces are apparently not inclined to meet this competition and continue to hold prices at $14 to $14.25, furnace. Southern iron, which is still held at $10, Birmingham, has made little headway in this market for the past eight months.

Reinforcing Bars

Effective July 9, bar mills instituted an advance in price to 1.75c., Pittsburgh, equivalent to 2.10c., New York. Withdrawal date for outstanding quotations made on the previous base of 1.65c., Pittsburgh, has not yet been set. Recall of old quotations is expected to be made within the next two weeks. The only important letting in the past week was 1400 tons for grade crossing elimination work for the Long Island Railroad, which was distributed among National Bridge Works, Igoe Brothers and Concrete Steel Co.

Scrap

Based upon expectations of receiving orders from certain Eastern steel mills, the Schiavone-Bonomo Corpn. is accumulating a substantial tonnage of No. 1 heavy melting steel for barge movement, for which $4 a ton, on barge, is being paid. No. 1 heavy melting steel in car lots is procurable at $2.85 a ton. All other grades are extremely quiet.

Cincinnati Pig Iron Sales in Small Lots

CINCINNATI, July 12.—Orders totaling about 400 tons for immediate shipment constituted pig iron demand the past week. The melt is low, and in some instances foundries are pooling orders to keep one plant in operation. Inquiry has disappeared. The trade, generally, feels that no improvement can be expected before the early fall and, accordingly, retrenchment policies are being pursued.

Scrap

Shipments of scrap are slow and mills are not buying, except in small bargain lots. Dealers' bids are unchanged.

New England Foundries Are More Hopeful

BOSTON, July 12.—While current sales of pig iron are still very small, sentiment among New England foundries is unquestionably better. Furnace representatives calling on the trade the past week were given to understand that foundries have decided business will be better before the national election and that it is time or nearly time to buy iron. Several are feeling out the market on round tonnages, but apparently are not quite ready to make formal inquiry. Despite the lack of orders, furnaces are firmly maintaining prices. Sales for the week consisted largely of Buffalo and Indian iron and approximated 300 tons.

With a cessation of buying for export, the scrap market has lapsed into a coma. Practically nothing was shipped out of New England to Pennsylvania the past week. The American Steel & Wire Co., Worcester, has not been much of a market factor.

Cast iron pipe prices have strengthened perceptibly. Pit cast pipe is now $26 a ton, foundry, or $31 to $32 a ton, delivered New England, up $2 to $3 a ton from the recent low level. Centrifugal pipe is selling on a basis of 40c. a foot for 6-in., or $30 a ton, delivered, an advance of about $2 a ton from the low level of 1932.

More activity is noted in by-product foundry coke, with deliveries ranging from spot to one month.

Canadian Steel Industry Sees Little Ahead

TORONTO, July 11.—There is nothing facing the iron and steel industry of Canada to indicate early improvement. On the other hand, only small orders are being closed, the greater part for spot delivery, and unless there is a change almost immediately plant operations will be further curtailed when present backlogs are cleaned up in the course of the next month or two. Representatives of leading companies are pinning faith to developments that may take place at the forthcoming Empire Economic Conference, and are now in session preparing briefs to be submitted in this connection. So far, however, all meetings have been behind closed doors so that no information is available as to which program may be followed at the conference.

Pig Iron

In this market business is holding to an even keel. Sales of merchant iron are being made in single car lots, with no forward orders reported.

Scrap

The demand for scrap continues spotty. While there are only a few small sales reported in steel scrap, and no shipments going forward to the Hamilton district, special grades of iron scrap are moving. Dealers report a fair demand for machinery cast, both in the Toronto and Montreal districts. Dealers' bid prices are unchanged.

Detroit Scrap Market Dull and Weak

DETROIT, July 11.—The local scrap market remains stagnant, with consumer buying almost totally suspended. Prices are soft and in some cases open-hearth grades are bringing 25c. a ton less than they did a week ago. Already burdened with excessive yard stocks, dealers are reluctant to purchase even the small tonnages of old material currently finding their way into the open market.

Cleveland Experiences Drop in Automobile Steel Orders

Demand Generally Is Lower—Wire Plant Postpones Resumption, Leaving Ingot Rate at 17 Per Cent

CLEVELAND, July 12.—Demand for finished steel has tapered off slightly as compared with June. Little new business is coming from the motor car industry, which is slowing down.

Ingot production by Cleveland steel plants this week is still at 17 per cent of capacity, to which it recently dropped. The American Steel & Wire Co., which shut down five open-hearth furnaces for the holiday, decided to postpone resumption of operations another week, or until July 18, as it had accumulated a stock of ingots.

The steel industry sees no prospect of improvement in orders before September, but is hopeful of a moderate gain during that month.

Pig iron is not moving as well as in June because of the decline in the demand from automobile foundries.

Concessions of $2 a ton are being made on commercial forging bars for the current quarter, the reason given for this concession being that producers did not desire to force up too rapidly the advance brought about by the recent adoption of a differential for these bars. Recent low prices on rail steel reinforcing bars seem to have disappeared, and small-lot sales have been made at the advance. Prices on other products are well maintained.

Pig Iron

Sales are limited to immediate needs, usually in car lots and never more than for two carloads. Local interests sold 1500 tons in these small orders during the week. Shipments are falling below those of June as the motor car industry is taking less iron than last month and there has been no gain in the demand from other sources. Prices are unchanged at $14 to $14.50, Cleveland, for foundry and malleable iron for outside shipment, price depending on the point of delivery. For local delivery, $15.50 is still quoted, but this is regarded as a nominal price, as no iron has been sold in Cleveland for some time.

Iron Ore

The movement continues very light and there is virtually no new demand. Shipments from Lake Erie docks during June were 265,845 tons, against 1,891,473 tons during the same month last year. June receipts were 116,112 tons at Lake Erie ports and 105,194 tons at Detroit and South Chicago. The dock balance July 1 was 5,374,337 tons, against 5,156,692 tons on the some date a year ago.

Sheets

Demand is light from all sources. Very little new business is coming from the automotive industry. Orders from the refrigerator manufacturers are holding up to recent volume, which is lighter now than early in the season. There is a tendency among some of the automobile companies to use cold-rolled instead of auto body sheets for some parts of automobile bodies, resulting in a saving of $3 a ton. While regular prices are being well maintained, some consumers are getting shipments of black sheets this month against contracts placed in the last quarter at concessions of $2 a ton from the regular 2.20c. price.

Strip Steel

While a slight spurt in orders for hot-rolled strip to fill in stocks came during the week from automobile accessory makers, the market generally is very dull. Local demand is being curtailed by the use by some stamping plants of sheet seconds in place of hot-rolled strip. Consumers have been slow in making third quarter contracts, but quite a few contracts were closed during the week. The market appears to be stabilized at 1.45c., Pittsburgh, to large buyers. Cold-rolled strip is steady at 2c., Cleveland.

Bolts and Nuts

There is very little demand from any source. The Ford Motor Co. continues to order nuts, but orders from other automobile companies are very scarce. The industry is operating at about 15 per cent of normal capacity. Prices are firm.

Bars, Plates and Shapes

Orders for the heavier rolled steel products are very light. There has been a slackening in the demand for bars from the motor car industry. Little new work is coming out in the building field. Cleveland has placed a contract for an addition to the Easterly sewage disposal plant to the Lowensohn Construction Co. This will require 280 tons of reinforcing bars already placed and 500 tons of sheet steel piling now pending. Bids have been taken for dock work in Erie requiring 330 tons of piling. A concession of $2 a ton on commercial forging bars to forge shops for the current quarter is being made by some of the mills by quoting a 1.55c., Cleveland, base and adding the recently adopted $3 a ton differential, making a 1.70c. local price for commercial forging bars. Forging quality bars carrying $5 a ton extra are 1.80c., Cleveland. Merchant bars are firm at 1.65c., Cleveland, and plates and shapes are 1.60c., Pittsburgh.

Warehouse Business

A revised price on flat rolled steel has been adopted by warehouses, effective July 11. All flat rolled steel under ¼ in. thick is placed on a 3c. price base. Heretofore that price has been applied to hoops and bars in No. 12 gage and heavier, but No. 13 gage and lighter have been 3.55c.

Scrap

Machine shop turnings in small quantities are being shipped from Cleveland to a Pittsburgh district consumer at $5.25 a ton, or about $2.25, Cleveland. One Valley consumer is taking a little busheling, for which it is paying $6.25, delivered. Locally, there is no new demand. Outstanding orders have about all been filled. Prices are nominal.

Renewed Foundry Activity in St. Louis District

ST. LOUIS, July 12.—Reports from St. Louis trade territory outside of the metropolitan district are that jobbing foundries are getting some new railroad business, and that a few of the stove plants are showing renewed activity. Locally, there is no improvement. Buying of pig iron continues on a spot basis. The local maker reports shipments against contracts for the first 10 days of July as being ahead of the same period last month. Prices are unchanged.

Steel

Bids will be opened July 26 for the South Valley Junction approach to the St. Louis municipal bridge in East St. Louis, requiring 950 tons of structural steel and 80 tons of reinforcing bars. Bids were opened last week at Jefferson City for 42 Missouri highway projects, requiring 735 tons of reinforcing bars. Railroads issued the usual contracts for third quarter requirements of plates, shapes and bars; specifications during second quarter were very light. Third quarter prices are unchanged and firm.

Scrap

A leading East Side mill is negotiating for several thousand tons of heavy melting steel, with the prospect of buying at a 25c. a ton reduction from the most recent purchase. Iron car axles are 75c. a ton lower, following the recent sale of this item by a local railroad. Machine shop turnings are 50c. off. Otherwise, the list is unchanged, although all prices are nominal. Railroad lists: Baltimore & Ohio, 3670 tons; Southern Pacific, 1850 tons; Kansas City Southern, 355 tons, and New York, Chicago & St. Louis, 48 carloads.

Eastern Pennsylvania Mills Increase Operations Slightly

Moderate Accumulation of Orders During Holiday Shutdown—Pig Iron and Scrap Dull and Weak

PHILADELPHIA, July 12. — A moderate accumulation of orders over the holiday period has resulted in increased rolling operations and the resumption of one open-hearth furnace. One plant has put on one unit each in the billet, plate and sheet departments, while another has started its sheet mills for the first time in three weeks. The starting of an additional open-hearth furnace was made necessary because steel stocks had become exhausted. Ingots were needed both to roll new business and to replenish stocks.

Inquiries and orders are both small and even scarcer than they have been previously. Mills are venturing no forecast as to what is ahead. The general view is that no pick-up may be expected during the remainder of the summer but that the fall may bring an upturn. Railroad and automobile buying is still at a low point. The Pennsylvania Railroad has not as yet released orders for track accessories for the 20,000 tons of rails which was specified last week against an old order.

Interesting reports are heard of old established concerns which are large users of steel and metal-working machinery planning to turn to new lines of production. These new lines, in some cases, will require the purchase of new equipment and will be large potential sources of steel consumption.

Pig Iron

Movements of pig iron generally have dropped back to carlot shipments. Inquiries are scarce. Prices are unsteady. No. 2 foundry is quoted at $13.50 to $14, furnace, with some domestic makers still holding to the higher level. Reports are heard of foreign shipments being quoted at a considerably lower price at docks. A nearby cast iron pipe foundry last week received 6000 tons of iron from the Netherlands which is said to have been added to an already sizable stock consisting of both Royal Dutch and English iron. Further shipments are reported to be either en route or under order. While standard low phosphorus iron is quoted at $21 to $22, furnace, it appears to be nominal at that figure, which it is said can be shaded $2 or $3. In the absence of offerings or sales at the lower levels, however, published quotations are left unchanged.

Plates, Shapes and Bars

A number of small inquiries are out for plates, while pending structural awards and work being figured in fabricating shops will call for good-sized lots of shapes, though it is doubtful if some of the work will get beyond the blue print stage for some time. The market for merchant steel bars is extremely dull, but is reported to be holding at 1.96c., Philadelphia, with plates and shapes quoted at 1.7935c. and 1.7495c. respectively. The Pusey & Jones Corpn., Wilmington, Del., was low bidder for the lighthouse tender Arbutus, and the United Dry Dock Co. was low bidder for the lighthouse tender Wisteria. The bids were opened in Washington last week. The former vessel will call for about 300 tons of plate and 100 tons of shapes. The Wisteria will require about 125 tons of plates and 40 tons of shapes.

Sheets

Small and scattered orders are being placed for sheets. Ordinarily large users are ordering in extremely light quantities, most of which are for immediate use. Automobile body builders are operating at a low rate. Sheet prices are said to be firm, though, as in other lines, volume requirements are lacking to test the market.

Imports

Last week imports here consisted of 599 tons of structural shapes, 18 tons of steel bars and 3 tons of steel bands, all from Belgium.

Scrap

Mills are accepting shipments on contract for immediate requirements. There is almost an entire absence of new buying and, in view of lagging steel works and foundry consumption, there is no sign of an early pick-up in demand.

Two Birmingham Pipe Plants Resume; Another Will Next Week

BIRMINGHAM, July 12.—It was hoped that July might bring a slight increase in pig iron melt, largely through pipe and also foundry work on Government contracts, but such is still lacking. The pig iron market is following the same slow, irregular and uncertain course of the past several months. The base price of $11 for the Southern market is being maintained. Furnace operations still consist of four active stacks, one furnace being on basic, two on foundry and one on spiegeleisen. National Cast Iron Pipe Co. resumed operations last week in both of its plants on a four to five-day a week schedule. This is an increase, as previous to the shutdown in June only one shop was in service. American Cast Iron Pipe Co., will remain idle for the first two weeks in July. It expects to resume work the last two weeks in July on a four-day a week schedule. Heretofore this company has been operating alternate weeks on a three to four-day schedule.

Steel

The slight improvement of several preceding weeks was not maintained last week, and tonnage was small and routine. Structural tonnage is still running in small lots except now and then when a Government job is placed. Ingalls Iron Works Co. has been awarded 1150 tons for the new post office and courthouse at Knoxville, Tenn. Prices are unchanged. Six open-hearths were operated last week, four by the Tennessee company at Fairfield and two by the Gulf States Steel Co. at Alabama City.

Scrap

Very little tonnage is being moved. Buying is infrequent. Quotations are nominal and unchanged.

Pacific Coast Market Dull; Prices Firmer

SAN FRANCISCO, July 11.—The holiday at the start of the past week had a tendency to affect adversely an already inactive market, and lettings were low. Sales executives on the Pacific Coast can not yet find evidence of a reversal of the downward trend. Encouragement is to be found in the fact that prices are firmer.

During the past week lettings of approximately 1200 tons of structural shapes and reinforcing bars were reported on major contracts, with inquiries for new projects involving approximately the same amount.

Fabricated Structural Steel

Lettings and New Projects Continue Light

WITH the bulk of awards in small tonnages, the total volume for the week called for only 9800 tons, of which more than half is for bridge work. The largest letting is 2000 tons for car towers for the World's Fair at Chicago. New projects of 5500 tons compare with 10,000 tons a week ago. A lock and dam on the Kanawha River at Marmet, W. Va., will require 1000 tons and an approach to the St. Louis municipal bridge at South Valley Junction, 950 tons. Awards follow:

NORTH ATLANTIC STATES

Bellows Falls, Vt., 200 tons, hotel and stores, to Lyons Iron Works.

Dixfield, Me., 150 tons, warehouse, to Lyons Iron Works.

Braintree, Mass., 100 tons, power house addition, to A. O. Wilson Structural Co.

Boston and Maine Railroad, 100 tons, bridge at Saco, Me., to Boston Bridge Works.

Whitehall, N. Y., 250 tons, highway bridge, to Lackawanna Steel Construction Co.

Rochester, N. Y., 300 tons, two buildings for University of Rochester, to Genesee Bridge Co.

Tonawanda, N. Y., 100 tons, bridge, to Buffalo Structural Steel Co.

State of New York, 175 tons, bridge in Cattaraugus County, to Lackawanna Steel Construction Corpn.

Downington, Pa., 110 tons, high school, to Bauman Iron Works, Reading, Pa.

Wilmington, Del., 285 tons, Harlan school, to McClintic-Marshall Corpn.

State of Pennsylvania, 160 tons, bridges in Tioga and Lycoming counties, to American Bridge Co.

SOUTH AND SOUTHWEST

State of Texas, 1160 tons, highway bridges; 350 tons to Virginia Bridge & Iron Co.; 450 tons to Houston Structural Steel Co., and 560 tons to Mosher Steel & Machinery Co.

Oilton, Okla., 400 tons, bridge, to Petroleum Iron Works.

Woodward County, Okla., 200 tons, highway bridge, to B. Siebbitt Iron & Foundry Co.

CENTRAL STATES

Troy, Ohio, 200 tons, highway bridge, to Brookville Bridge Co.

Chicago, 900 tons, General Motors exhibition building at World's Fair, to Gage Structural Steel Co. and Duffin Iron Works.

Chicago, 2000 tons, car towers for World's Fair, to Mississippi Valley Structural Steel Co.

Seneca, Ill., 1200 tons, highway bridge, to Wisconsin Bridge & Iron Co

Coffeyville, Kan., 450 tons, heaters for Sinclair Refining Co., to Lackawanna Steel Construction Corpn.

WESTERN STATES

Seattle, 625 tons, County bridge over Green River, to Isaacson Iron Works.

El Centro, Cal., 110 tons, post office, to Minneapolis-Moline Power Implement Co.

Los Angeles, 115 tons, Columbia Steel Co. plant additions, to Pacific Iron & Steel Co.

Sacramento County, Cal., 725 tons, highway bridge, to Moore Drydock Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Erie Railroad, 200 tons, bridge at Salamanca, N. Y.

Farnhurst, Del., 135 tons, bridge on du Pont Highway for Pennsylvania Railroad; bids to be opened July 19.

THE SOUTH

Marmet, W. Va., 1000 tons, dam and lock gates at Kanawha River.

Jackson, Miss., 700 tons, post office.

State of Texas, 500 tons, highway beam spans.

CENTRAL STATES

Illinois Central Railroad, 650 tons, bridge at La Salle, Ill.

State of Wisconsin, 500 tons, several highway bridges.

Milwaukee, 100 tons, transit shed for Milwaukee Board of Harbor Commissioners; bids closed July 13.

East St. Louis, Ill., 950 tons, South Valley Junction approach to St. Louis municipal bridge; bids to be opened July 26.

WESTERN STATES

State of Wyoming, 200 tons, highway bridges in Johnson County; bids close July 20.

Pasadena, Cal., 200 tons, gate structures, Pine Canyon Dam; bids close July 26.

Reno, Nev., 200 tons, post office; bids close July 28.

San Francisco, 125 tons, alterations on Mills Building.

FABRICATED PLATE

AWARDS

New Orleans, 1000 tons, five barges for Anderson, Clayton & Co., to National Bridge Co.

Quincy, Mass., 165 tons, three oil tanks, Quincy Oil Co., to Chicago Bridge & Iron Co.

St. Louis, 2000 tons, tanks for Phillips Petroleum Co., to an unnamed bidder.

NEW PROJECTS

Santa Clara, Cal., 300 tons, two water storage tanks; Pittsburgh-Des Moines Steel Co., low on alternate.

Cast Iron Pipe

Peabody, Mass., awarded 200 tons of 6-in. and larger to Warren Foundry & Pipe Corpn.

Rocky Hill, Conn., placed 500 tons of 6-in. and larger with R. D. Wood & Co.

Greenwich, Conn., has taken bids on 100 tons of 6- to 20-in. for sewers.

Latham's Corner, N. Y., awarded 100 tons of 6-in. to United States Pipe & Foundry Co

Baltimore placed upward of 1000 tons of 6-in. and larger with United States Pipe & Foundry Co.

Washington purchased about 1000 tons of 36-in. from R. D. Wood & Co.

Ann Arbor, Mich., American Cast Iron Pipe Co. is low bidder on 1200 tons of 6- to 12-in.

Appleton, Wis., closes bids July 16 on one carload of 6-in. and 2800 lin. ft. 12-in. class 250 centrifugal pipe or equal.

Cheyenne, Wyo., placed 300 tons of 6-, 8-, 10- and 12-in. with National Cast Iron Pipe Co.

Blaine, Wash., has called for informal bids on 12-, 16- and 18-in. pipe for a 3000-ft. main from the city reservoir.

Pipe Lines

Producers Pipe Line Co., Muskegon, Mich., recently organized by John L. Borden, president, Old Dutch Refining Co., and H. D. Atha, general manager, Gordon Oil Co., both Muskegon, is building a pipe line from Central Michigan oil fields, near North Bradley, to Muskegon, for oil supply for refinery of Old Dutch Refining Co. Line will have capacity of about 3500 bbl. daily. Mr. Borden and associates are organizing two companies under names of Michigan Natural Gas Pipe Line Co. and West Michigan Gas Co. First noted plans natural gas pipe line from Mount Pleasant, Mich., fields to Muskegon and vicinity; West Michigan company will install a natural gas distribution system at different centers along route of main line.

Lycoming Natural Gas Co., Wellsboro, Pa., is purchasing right-of-way for 20-in. welded steel pipe line from Farmington Township oil fields, Tioga County, to Heber Township, Potter County, about 40 miles, and plans to begin work soon.

Cities Fuel Gas Corpn., 204 Arcade Building, Ashland, Ky., asks bids until Aug. 1 for installation of a natural gas distribution system at Owenton, Ky., including pipe lines, fittings, connections, meters, etc.

Buffalo Steel Output Stepped Up Slightly

BUFFALO, July 12.—While the past week was slow, owing to the holiday, Buffalo pig iron makers have received a few orders, mostly for carload lots. There were also two or three 100-ton lots for spot shipment. No large inquiries are out.

Steel

The Wickwire Spencer Steel Corpn. has put on an open-hearth furnace. The Lackawanna plant of Bethlehem Steel has reduced its operation to three open-hearths, and Republic Steel charged three furnaces Saturday night to operate part of this week. The Seneca Iron & Steel Co. is operating at about 25 per cent. A Buffalo fabricator of structural steel has taken one 175-ton bridge for the State of New York in Cattaraugus County and one 250-ton bridge for the State of New York in Washington County; also a 100-ton post office at Niagara Falls. Another Buffalo fabricator has taken a bridge in Tonawanda, N. Y., 110 tons. Reinforcing bar business looks more promising.

Scrap

Releases on old stove plate orders are noted, but otherwise there is no activity.

Reinforcing Steel

Awards 2600 Tons—New Projects 2550 Tons

AWARDS

Cambridge, Mass., 200 tons, telephone exchange, to Barker Steel Co.

Long Island Railroad, 1400 tons, grade crossing elimination at Valley Stream, N. Y.; 700 tons to National Bridge Works; 350 tons to Igoe Brothers; 350 tons to Concrete Steel Co.; Foley Brothers, Inc., general contractor.

State of Kentucky, 125 tons, highway construction, to Dudley Bar Co.

State of Illinois, 225 tons, bridge, to Joseph T. Ryerson & Son, Inc.

Cleveland, 280 tons, addition for Easterly sewage disposal plant, to Patterson Leitch Co.

Contra Costa County, Cal., 120 tons, State highway structures, to Soule Steel Co.

Pasadena, Cal., 225 tons, St. Joseph Hospital, to Blue Diamond Corpn.

NEW REINFORCING BAR PROJECTS

Milwaukee, 1000 tons, Thirty-fifth Street viaduct; bids in.

Bismark, N. D., 400 tons, State Capitol building.

Jefferson City, Mo., 735 tons, State highway projects.

Alameda County, Cal., 113 tons, State highway structures, bids close July 27.

Los Angeles, 275 tons, San Gabriel Dam No. 2, bids close July 18.

Non-Ferrous Metals Only Sentimentally Buoyed by Lausanne Agreement

NEW YORK, July 12.—The outcome of the Lausanne conference last week has thus far effected little change in either the domestic or foreign copper markets. Although sentiment was temporarily buoyed by the news, demand for copper has remained listless. The industry is apparently more directly concerned with negotiations in progress at London for organizing a new export association. Until such a body is organized, the export situation will in all likelihood continue in its present unsettlement. Accurate gaging of foreign prices is difficult. Competition for business in the major foreign markets, France and Germany, is particularly keen, and some foreign producers are understood to have offered electrolytic metal at 5c., c.i.f. European ports, while others have gone as low as 4.95c. Domestic producers, however, are manifesting little disposition to meet this competition. Copper Exporters, Inc., which has in one instance offered metal at 5c., c.i.f. foreign ports, for account of one of its two remaining foreign members, in view of its majority American membership is not budging from its special posting of 5.50c. Although scattered offerings for domestic delivery are reported at 5.25c., delivered, most of the leading producers are holding to a price of 5.37½c., delivered Connecticut. Lake copper is dormant at 5.50c., delivered.

Tin

Although dealer buying experienced occasional spurts as an aftermath of prospective improvement abroad, consumer interest in tin continues to be apathetic. Slight upward fluctuations in the New York price of tin, however, reflect the influence of the stronger tone of the foreign markets. Spot Straits tin at New York was quoted today at 21.12½c., an advance of ¾c. over THE IRON AGE quotation a week ago. The London market was also higher, with today's quotation for spot standard at £125 15s., future standard at £127 10s. and spot Straits at £130 15s. The buyers' price in Singapore today was £131 10s. The higher prices have brought out freer offerings of Chinese tin, most of which have been fairly well absorbed here. United Kingdom warehouse stocks of tin decreased 92 tons last week to a total of 33,282 tons. Shipments from the Straits up to and including July 9 aggregated 1384 tons, indicating a rate of 4000 tons for the month.

Lead

A reduction of $1 a ton from the previous quotation to 2.70c., New York, and 2.55c., St. Louis, was announced yesterday by the leading Eastern and Western factors. The lower prices were largely occasioned by competition from small producers. With prices still reflecting easy tendencies, buyers are hesitant about covering their forward needs, and current business is principally for car lots for prompt shipment. Battery manufactures and corroders are taking the bulk of current deliveries, while cable makers are notably lagging in specifying their needs.

Zinc

Despite a virtual absence of consumer interest, the price of zinc has remained fairly steady throughout the past week at 2.60c., East St. Louis, and 2.97c., New York. Refusal of smelters to pay $20 a ton for ore, with metal selling at only 2.60c., resulted in scattered sales of small lots of ore in the Joplin district on Saturday at $16 a ton. The important mining interests, however, have not yet wavered in their determination to hold the ore price at $20.

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The Week's Prices. Cents Per Pound for Early Delivery

	July 6	July 7	July 8	July 9	July 11	July 12
Lake copper, New York	5.50	5.50	5.50	5.50	5.50	5.50
Electrolytic copper, N. Y.*	5.12½	5.12½	5.12½	5.12½	5.12½	5.12½
Straits tin, spot, N. Y.	20.87½	21.12½	21.10		20.62½	21.12½
Zinc, East St. Louis	2.60	2.60	2.60	2.60	2.60	2.60
Zinc, New York	2.97	2.97	2.97	2.97	2.97	2.97
Lead, St. Louis	2.60	2.60	2.60	2.60	2.55	2.55
Lead, New York	2.75	2.75	2.75	2.75	2.70	2.70

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Aluminum, 98 to 99 per cent pure, 22.50c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 5.00c. a lb., New York.
Brass ingots, 85-5-5-5, 6.00c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	22.50c. to 23.50c.
Tin, bar	24.50c. to 26.50c.
Copper, Lake	7.50c. to 8.50c.
Copper, electrolytic	7.25c. to 8.25c.
Copper, casting	7.00c. to 8.00c.
*Copper sheets, hot-rolled	14.87½c.
*High brass sheets	12.00c.
*Seamless brass tubes	15.25c.
*Seamless copper tubes	14.37½c.
*Brass rods	9.75c.
Zinc, slabs	4.25c. to 4.75c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	3.75c. to 4.25c.
Lead, bar	5.50c. to 6.50c.
Lead sheets	7.50c.
Antimony, Asiatic	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus	23.20c.
Alum. No. 1 for remelting, 98 to 99 per cent	16.00c.
Solder, ½ and ½	14.75c. to 15.75c.
Babbitt metal, commercial grade	18.00c. to 28.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

Metals from Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	24.25c.
Tin, bar	26.25c.
Copper, Lake	6.50c.
Copper, electrolytic	6.50c.
Copper, casting	6.25c.
Zinc, slab	4.25c. to 4.50c.
Lead, American pig	3.50c. to 3.75c.
Lead, bar	6.75c.
Antimony, Asiatic	9.00c.
Babbitt metal, high grade	28.25c.
Babbitt metal, high grade	27.25c.
Solder, ½ and ½	15.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	3.75c.	4.25c.
Copper, hvy. and wire	3.50c.	4.125c.
Copper, light and bottoms	2.75c.	3.375c.
Brass, heavy	1.625c.	2.25c.
Brass, light	1.25c.	1.75c.
Hvy. machine composition	2.625c.	3.25c.
No. 1 yel. brass turnings	2.00c.	2.375c.
No. 1 red brass or compos. turnings	2.50c.	3.00c.
Lead, heavy	1.75c.	2.125c.
Zinc	1.00c.	1.375c.
Cast aluminum	2.50c.	4.00c.
Sheet aluminum	6.50c.	8.00c.

Westinghouse Awarded $1,750,000 Contract

As part of an electrical project calling for the expenditure of $8,500,000 in the next two years, a contract of approximately $1,750,000 has been awarded to the Westinghouse Electric & Mfg. Co. by the Philadelphia Electric Co. for a 183,00' kv-a. turbine generator to be installed at the Richmond generating plant, on the Delaware River, Philadelphia. The Westinghouse contract is among the largest awarded for generating equipment in several years.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh mill .....1.60c.
F.o.b. Chicago .....1.70c.
Del'd Philadelphia .....1.91c.
Del'd New York .....1.95c.
Del'd Detroit .....1.80c.
F.o.b. Cleveland .....1.65c.
F.o.b. Lackawanna .....1.70c.
F.o.b. Birmingham .....1.75c.
C.l.f. Pacific ports .....2.10c.

Billet Steel Reinforcing
(as quoted by distributors)

F.o.b. P'gh mills, 40, 50, 60-ft....1.60c.
F.o.b. Birmingham, mill lengths...1.75c.
F.o.b. Cleveland .....1.60c. to 1.75c.

Rail Steel

F.o.b. mills, east of Chicago dist .....1.35c. to 1.45c.
F.o.b. Chicago Heights mills.....1.50c.

Iron

Common iron, f.o.b. Chicago.....1.65c.
Refined iron, f.o.b. P'gh mills.....2.75c.
Common iron, del'd Philadelphia...2.11c.
Common iron, del'd New York.....2.15c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mill .....1.60c.
F.o.b. Chicago .....1.70c.
F.o.b. Birmingham .....1.75c.
Del'd Cleveland .....1.8035c.
Del'd Philadelphia .....1.7935c.
F.o.b. Coatesville .....1.70c.
F.o.b. Sparrows Point .....1.70c.
Del'd New York .....1.898c.
C.l.f. Pacific ports .....2.00c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mill .....1.60c.
F.o.b. Chicago .....1.70c.
F.o.b. Birmingham .....1.75c.
F.o.b. Lackawanna .....1.70c.
F.o.b. Bethlehem .....1.70c.
Del'd Cleveland .....1.8035c.
Del'd Philadelphia .....1.7495c.
Del'd New York .....1.86775c.
C.l.f. Pacific ports (standard)....2.10c.
C.l.f. Pacific ports (wide flange)...2.20c.

Steel Sheet Piling

Base per Lb.

F.o.b. Pittsburgh .....1.90c.
F.o.b. Chicago mill .....2.95c.
F.o.b. Buffalo .....2.00c.

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.45c. to 2.65c. per Lb.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2000 (½% Nickel)	$0.25
2100 (1½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and Squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets unde 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....1.70c.
Bars, f.o.b. Chicago.....1.75c.
Bars, Cleveland .....1.75c.
Bars, Buffalo .....1.75c.
Bars, Detroit .....1.90c.
Bars, eastern Michigan .....1.95c.
Shafting, ground, f.o.b. mill.....†2.05c to 3.00c.

*In quantities of 10,000 lb. or more.
†According to size.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot-rolled

Base per Lb.

No. 10 f.o.b. Pittsburgh .....1.55c.
No. 10 f.o.b. Chicago mill .....1.65c.
No. 10 del'd Philadelphia .....1.86c.
No. 10 f.o.b. Birmingham.....1.70c.
No. 10, c.l.f. Pacific Coast ports.2.17½c.

Hot-rolled and Annealed

No. 10, Pittsburgh .....1.70c.
No. 10, Chicago mills .....1.80c.
No. 10, Birmingham .....1.85c.
No. 10, Pacific Coast ports.....2.32½c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh .....2.20c.
No. 24, f.o.b. Chicago mills .....2.30c.
No. 24, del'd Philadelphia .2.46c. to 2.51c.
No. 24, f.o.b. Birmingham .....2.35c.
No. 24, c.l.f. Pacific Coast ports..2.85c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh ....2.25c.
No. 10 gage, f.o.b. Chicago mills..2.35c.
No. 10 gage, del'd Philadelphia ...2.46c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh ....2.75c.
No. 20 gage, f.o.b. Chicago mills..2.85c.
No. 20 gage, del'd Philadelphia ...3.06c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh..2.85c. to 2.90c.

Steel Furniture Sheets

No. 16, f.o.b. Pittsburgh .....2.65c.
No. 20, f.o.b. Pittsburgh .....3.15c.

(Prices on furniture stock include stretcher leveling but not reshearing.)

Galvanized Sheets

No. 24, f.o.b. Pittsburgh .....2.85c.
No. 24, f.o.b. Chicago mills.....2.95c.
No. 24, del'd Philadelphia .....3.10c.
No. 24, f.o.b. Birmingham .....3.00c.
No. 24, c.l.f. Pacific Coast ports...3.50c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. P'gh .....2.80c. to 3.00c.

Vitreous Enameling Stock

No. 16, f.o.b. Pittsburgh...2.50c. to 2.60c.
No. 20, f.o.b. Pittsburgh...3.00c. to 3.10c.

Tin Mill Black Plate

No. 28 f.o.b. Pittsburgh .....2.40c.
No. 28 Chicago mill .....2.50c.

Tin Plate

Base per Box

Standard cokes, f.o.b. P'gh district mill $4.75
Standard cokes, f.o.b. Gary.....4.85

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. $9.50
15-lb. coating I.C. 12.00
20-lb. coating I.C. 13.00
25-lb. coating I.C. 14.10
30-lb. coating I.C. 14.90
40-lb. coating I.C. 16.70

Hot-rolled Hoops, Bands and Strips

Base per Lb.

All widths up to 24 in., Pittsburgh .....1.45c. to 1.50c.
All widths up to 24 in., Chicago .....1.55c. to 1.60c.
Cooperage stock, P'gh.....1.55c. to 1.60c.
Cooperage stock, Chicago..1.65c. to 1.70c.

Cold-Rolled Strips

F.o.b. Pittsburgh .....2.00c.
F.o.b. Cleveland .....2.00c.
Del'd Chicago .....2.20c.
F.o.b. Worcester .....2.20c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland.....2.90c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

(After Dec. 31, extras of 10c. a 100 lb. on mixed and joint carloads, 25c on pool carloads and 40c. on less than carloads will be applied on all merchant wire products.)

To Manufacturing Trade

Bright wire .....2.20c.
Spring wire .....3.20c.

To Jobbing Trade

Base per Keg

Standard wire nails.....$1.95
Smooth coated nails.....1.95
Galvanized nails 3.95

Base per Lb.

Smooth annealed wire.....2.35c.
Smooth galvanized wire.....2.80c.
Polished staples .....2.50c.
Galvanized staples .....2.75c.
Barbed wire, galvanized.....2.60c.
Woven wire fence No. 9 gage, per net ton $55.00
Woven wire fence, No. 12½ gage and lighter, per net ton..... 60.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

STEEL PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+9	+34
¼ to ⅜	53	27½	½	25	7
½	58	44½	¾	30	13
¾	62	50½	1 and 1¼	33	17
1 to 3	64	52½	1½ and 2	37	20

Lap Weld

2	57	45½	2	25	11
2½ to 6	61	49½	2½ to 3½	30	15
7 and 8	58	45½	4 to 6	32	19
9 and 10	56	43½	7 and 8	31	18
11 and 12	55	42½	9 to 12	28	13

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+11	+46
¼ to ⅜	49	32½	½	25	9
½	55	44½	¾	30	14
¾	60	49½	1 to 2	36	20
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	31	15
2½ to 4	59	48½	2½ to 4	36	22
4½ to 6	58	47½	4½ to 6	35	21
7 to 8	54	41½	7 and 8	33	19
9 and 10	47	34½	9 to 12	23	10
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2½% and on galvanized by 1½ points with supplementary discounts of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	28	1¼ in.	1
		1½ in.	x
2½ in.—2¾ in.	46	2 in.—2¼ in.	13
3 in.	52	2½ in.—2¾ in.	16
3¼ in.—3¾ in.	54	3 in.	17
4 in.	57	3¼ in. to 3½ in.	18
4½ in. to 6 in.	46	4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	50
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages takes the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30% base (carloads) 55
Carbon, 0.30% to 40% base 50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

Rails

Per Gross Ton

Standard, f.o.b. mill.....$43.00
Light (from billets), f.o.b. mill.....32.00
Light (from rail steel, f.o.b. mill) $28.00 to 30.00

Track Equipment

Base per 100 Lb.

Spikes, 9/16-in. and larger.....$2.60
Spikes, ½-in. and larger.....2.60
Spikes, boat and barge.....2.80
Tie plate, steel 1.85
Angle bars 2.75
Track bolts, to steam railroads.....3.50
Track bolts, to jobbers, all sizes, per 100 count.....73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts 75
†Carriage bolts 75
Lag bolts 75
Plow bolts, Nos. 1, 2, 3 and 7 heads .. 75
Hot-pressed nuts, blank or tapped, square 75
Hot-pressed nuts, blank or tapped, hexagons 75
C.p.c. and t. square or hex. nuts, blank or tapped 75
Washers*....7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts 75
Semi-finished hexagon castellated nuts, S.A.E. 75
Stove bolts in packages, P'gh. ..... 77½, 25 and 10
Stove bolts in packages, Ch'go. ..... 77½, 25 and 10
Stove bolts in plugs, Cleveland. ..... 77½, 25 and 10
Stove bolts in bulk, P'gh 86
Stove bolts in bulk, Chicago 86
Stove bolts in bulk, Cleveland 86
Tire bolts ..... 60 and 10

Discount of 75 per cent off on bolts and nuts applies on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

Base per Lb.

F.o.b. Pittsburgh or Cleveland.....$2.25
F.o.b. Chicago.....70, 10 and 5

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh .....70, 10 and 5
F.o.b. Cleveland .....70, 10 and 5
F.o.b. Chicago .....70, 10 and 5

Cap and Set Screws

Discounts to Jobbers

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller ..... 80 and 25
Milled standard set screws, case hardened, 1 in. dia. and smaller ..... 75 and 10
Milled headless set screws, cut thread, ⅝ in. and smaller ..... 75 and 10
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in dia. and smaller ..... 80, 25 and 10
Upset set screws, sq. head, 1 in. dia. and smaller ..... 75, 10 and 10
Upset set screws, 1⅛ in. and larger, ... 75 and 10
Milled studs 70

SEMI-FINISHED STEEL

Billets and Blooms

Per Gross Ton

Rerolling, 4-in. and under 10-in., Pittsburgh $26.00
Rerolling, 4-in. and under 10-in., Youngstown 26.00
Rerolling, 4-in. and under 10-in., Cleveland 26.00
Rerolling, 4-in. and under 10-in., Chicago 29.00
Forging quality, Pittsburgh.....33.00
Forging quality, Youngstown.....33.00

Sheet Bars

(Open-Hearth or Bessemer)

Per Gross Ton

Pittsburgh $26.00
Youngstown 26.00
Cleveland 26.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

Per Gross Ton

Pittsburgh $26.00
Youngstown 26.00
Cleveland 26.00

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(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$37.00
Cleveland	37.00
Chicago	38.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.00 to $2.15
Foundry, f.o.b. Connellsville prompt	3.00 to 4.25
Foundry, by-product, Chicago ovens	7.00
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b., ovens	8.00
Foundry, by-products, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.50
Mine run coking coal, f.o.b. W. Pa.	1.50 to 1.60
Gas coal, ¾-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	0.50 to 0.65
Gas slack, f.o.b. W. Pa. mines	0.50 to 0.65

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	2.65c.
No. 5 industrial fuel oil	2.45c.

Per Gal. f.o.b. Cleveland

No. 3 industrial fuel oil	4.62½c.
No. 4 distillate	4.00c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works: High-heat Duty Brick	Intermediate Duty Brick
Penn.	$35.00	$25.00 to $30.00
Maryland	35.00	25.00 to 30.00
New Jer.	$44.00 to 57.00	
Ohio	35.00	25.00 to 30.00
Kentucky	35.00	25.00 to 30.00
Missouri	35.00	30.00
Illinois	35.00	25.00 to 30.00
Ground fire clay, per ton	6.50	

Chrome Brick

	Per Net Ton
Standard size	$42.50

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$61.50
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$34.40 to $38.40
4-in., del'd Chicago	37.40 to 41.40
6-in. and larger, del'd New York	28.20
4-in., del'd New York	31.20
6-in. and larger, Birm'ham	$32.00 to 33.00
4-in., Birmingham	35.00 to 36.00

Class "A" and gas pipe, $3 extra.

Pig Iron, Ores, Ferroalloys

VALLEY

Per gross ton, f.o.b. Valley furnace:

Basic	$13.50
Bessemer	15.00
Gray forge	14.50
No. 2 foundry	14.50
No. 3 foundry	14.00
Malleable	$14.50 to 15.00
Low phos., copper free	25.00

Freight rate to Pittsburgh or Cleveland district, $1.89.

PITTSBURGH

Per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$14.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.00
Bessemer	15.00

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnace:

N'th'n No. 2 fdy.	$15.50 to $16.00
N'th'n No. 1 fdy.	16.00 to 16.50
Malleable, not over 2.25 sil.	15.50 to 16.00
High phosphorous	15.50 to 16.00
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	16.14
Low phos., sil. 1 to 2, Copper free	27.50
Silvery, sil. 8 per cent	23.67
Bess. ferrosil'n, 15 per cent	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd St. Louis	$18.30 to 18.80
Southern No. 2 fdy. del'd	14.56
Northern malleable, del'd	18.30 to 18.80
Northern basic, deliv'd	18.30 to 18.80

Freight rates 83c. (average) Granite City to St. Louis; $2.30 from Chicago; $1.56 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:

*Buffalo, No. 2, del'd east N. J.	$17.41 to $17.66
East Pa. No. 2 fdy.	15.02 to 15.52
East Pa. No. 2X fdy.	15.52 to 16.02

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.04 to $20.04
*Buffalo, sil. 2.25 to 2.75	19.04 to 20.04
†Buffalo, sil. 1.75 to 2.25	17.41 to 18.91
†Buffalo, sil. 2.25 to 2.75	17.41 to 18.91
*Ala., sil. 1.75 to 2.25	19.74
*Ala., sil. 2.25 to 2.75	20.24
†Ala., sil. 1.75 to 2.25	15.88
†Ala., sil. 2.25 to 2.75	16.28

Freight rates: $5.05 all rail from Buffalo, and $3.41 to $3.91 rail and water from Buffalo when $1 barge and $2 to $2.50 New England freight rate are obtainable; $9.75 all rail from Alabama and $5.88 rail and water from Alabama to New England seaboard.

*All-rail rate.

†Rail-and-water rate.

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	$17.01 to 17.59
S'th'n Ohio silvery, 8%	21.02

Freight rates, $2.02 from Ironton and Jackson, Ohio; $3.82 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$14.34 to $14.81
East. Pa. No. 2X	14.84 to 15.34
East. Pa. No. 1X	15.34 to 15.84
Basic (del'd east. Pa.)	15.50
Malleable	17.50 to 18.00
Stand. low phos. (east. Pa. furnace)	21.00 to 22.00
Con. b'r'g low phos. (f.o.b. furnace)	21.00 to 22.50
Va. No. 2 plain	21.54 to 22.04
Va. No. 2X	22.04 to 22.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces; $4.67 from Virginia furnaces.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy. (local delivery)	$15.50
S'th'n fdy. sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.50
Ohio silvery, 8 per cent	21.87
Stand. low. phos., Valley	23.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 55c. average local switching charge; $3.12 from Jackson, Ohio; $6.14 from Birmingham.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:

No. 2 fdy., 1.75 to 2.25 sil.	$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

CANADA

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	$23.00 to $23.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$68.00
Foreign, 80%, Atlantic or Gulf port, duty paid	68.00

Prices for lots of one carload or more; extras applied on less than carload lots.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$25.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$77.50
50% (less carloads)	85.00
75% (carloads)	126.00
75% (less carloads)	136.00
14% to 16% (f.o.b.) Welland, Ont., in carloads)	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$20.50	14%	$23.50
11%	21.00	15%	24.00
12%	21.50	16%	25.00
13%	22.50	17%	26.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$18.00	12%	$20.50
7%	18.50	13%	21.50
8%	18.75	14%	22.50
9%	19.00	15%	23.00
10%	19.50	16%	24.00
11%	20.00	17%	25.50

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	$1.08
Ferrotungsten, less carloads	$1.15 to 1.20
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	10.00c
Ferrochromium, 2% carbon	17.00c to 17.50c
Ferrochromium, 1% carbon	19.00c to 20.00c
Ferrochromium, 0.10% carbon	23.50c to 25.00c
Ferrochromium, 0.06% carbon	25.50c to 27.00c
Ferrovanadium, del., per lb. contained Va.	$3.05 to $3.30
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace in carloads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	68.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton	$91.00
Silico spiegel, per ton, f.o.b. furnace, car lots	42.50
Ton lots or less, per ton	47.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	105.00
1% carbon grade	115.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, average 68½% iron	9.00c.
Iron, basic or foundry, Swedish, average 65% iron	8.00c.
Iron, basic or foundry, Russian, aver. 63% iron (nom.)	9.00c.
Manganese, Caucasian, washed 52%	24.00c.
Manganese, African, Indian, 50-52%	23c. to 24c.
Manganese, Brazilian, 46 to 48%	21c. to 22c.

	Per Gross Ton
Tungsten, Chinese wolframite	$10.75 to $11.00
Tungsten, domestic scheelite	$10.00 to 10.50
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic seaboard	18.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic seaboard	20.00

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	$20.31
No. 2 lump, 85-5, Kentucky and Illinois mines, freight allowed, Pittsburgh basis	22.31
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	17.00 to 17.40
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	32.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$8.00 to $8.50
No. 2 heavy melting steel	6.50 to 7.00
No. 2 railroad wrought	8.00 to 8.50
Scrap rails	8.00 to 8.50
Rails 3 ft. and under	10.50 to 11.00
Sheet bar crops, ordinary	8.00 to 8.50
Compressed sheet steel	7.50 to 8.00
Hand bundled sheet steel	6.50 to 7.00
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	4.50 to 5.00
Short shov. steel turnings	4.50 to 5.00
Short mixed borings and turnings	4.50 to 5.00
Cast iron borings	4.50 to 5.00
Cast iron carwheels	8.00 to 8.50
Heavy breakable cast	8.00 to 8.50
No. 1 cast	9.00 to 10.00
Railr. knuckles and couplers	8.50 to 9.00
Rail. coil and leaf springs	8.50 to 9.00
Rolled steel wheels	8.50 to 9.00
Low phos. billet crops	10.50 to 11.00
Low phos. sheet bar crops	10.50 to 11.00
Low phos. plate scrap	9.00 to 9.50
Low phos. punchings	9.00 to 9.50
Steel car axles	10.00 to 10.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$4.50 to $5.00
Shoveling steel	4.50 to 5.00
Frogs, switches and guards	4.50 to 5.00
Hydraulic comp. sheets	3.00 to 3.50
Drop forge flashings	3.00 to 3.50
No. 1 busheling	3.00 to 3.50
Rolled carwheels	6.50 to 7.00
Railroad tires	6.50 to 7.00
Railroad leaf springs	7.50 to 8.00
Axle turnings	4.00 to 4.50
Steel couplers and knuckles	5.50 to 6.00
Coil springs	7.50 to 8.00
Axle turnings (elec. fur.)	4.50 to 5.00
Low phos. punchings	7.00 to 7.50
Low phos. plates, 12 in. and under	6.50 to 7.00
Cast iron borings	2.00 to 2.50
Short shoveling turnings	2.00 to 2.50
Machine shop turnings	1.75 to 2.25
Rerolling rails	6.75 to 7.25
Steel rails, less than 3 ft.	7.50 to 8.00
Steel rails, less than 2 ft.	8.00 to 8.50
Angle bars, steel	6.50 to 7.00
Cast iron carwheels	5.50 to 6.00
Railroad malleable	4.50 to 5.00
Agricultural malleable	4.50 to 5.00
* Relaying rails, 56 to 60 lb.	15.00 to 17.00
* Relay rails, 65 lb. and up	18.00 to 23.00

	Per Net Ton
Iron angle and splice bars	$5.25 to $5.75
Iron arch bars, transoms	4.50 to 5.00
Iron car axles	10.50 to 11.00
Steel car axles	6.50 to 7.00
No. 1 railroad wrought	3.75 to 4.25
No. 2 railroad wrought	4.00 to 4.50
No. 1 busheling	2.50 to 3.00

No. 2 busheling	$1.50 to	$2.00
Locomotive tires, smooth	7.50 to	8.50
Pipes and flues	2.50 to	3.00
No. 1 machinery cast	6.00 to	6.50
Clean automobile cast	6.25 to	6.75
No. 1 railroad cast	5.25 to	5.75
No. 1 agricultural cast	5.00 to	5.50
Stove plate	4.75 to	5.25
Grate bars	4.50 to	5.00
Brake shoes	5.50 to	6.00

*Relaying rails, including angle bars or match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$6.00 to	$6.50
No. 2 heavy melting steel	4.50 to	5.00
No. 1 railroad wrought	7.00 to	7.50
Bundled sheets	4.00 to	4.50
Hydraulic compressed, new	4.50 to	5.00
Hydraulic compressed, old	4.00 to	4.50
Machine shop turnings	3.00 to	3.50
Heavy axle turnings	5.50 to	6.00
Cast borings (nom.)	3.00 to	3.50
Heavy breakable cast	7.50 to	8.00
Stove plate (steel works)	6.00 to	6.50
No. 1 low phos. heavy	9.50 to	10.00
Couplers and knuckles	6.50 to	7.00
Rolled steel wheels	6.50 to	7.00
No. 1 blast furnace (nom.)	3.00 to	3.50
Spec. iron and steel pipe	5.50 to	6.00
Shafting	10.00 to	11.00
Steel axles	13.50 to	14.00
No. 1 forge fire	5.50 to	6.00
Cast iron carwheels	8.00 to	8.50
No. 1 cast	8.00 to	8.50
Cast borings (chem.)	8.00 to	10.00
Steel rails for rolling	9.00 to	9.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$6.25 to	$6.75
No. 2 heavy melting steel	5.50 to	5.75
Compressed sheet steel	5.50 to	6.00
Light bundled sheet stampings	4.50 to	5.00
Drop forge flashings		5.00
Machine shop turnings	2.00 to	2.50
Short shoveling turnings	4.00 to	4.50
No. 1 busheling	5.00 to	5.50
Steel axle turnings	5.00 to	5.50
Low phos., billet crops	9.00 to	10.00
Cast iron borings	3.50 to	4.00
Mixed borings and short turnings	3.00 to	3.50
No. 2 busheling	3.00 to	3.50
No. 1 cast	6.50 to	7.00
Railroad grate bars	5.00 to	5.50
Stove plate	5.00 to	5.50
Rails under 3 ft.	8.50 to	9.00
Rails for rolling	8.50 to	9.00
Railroad malleable	7.25 to	7.50
Cast iron carwheels	7.00 to	7.50

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$6.50 to	$7.00
No. 2 heavy melting scrap		5.00
Scrap rails	6.75 to	7.25
New hydraul. comp. sheets		5.00
Old hydraul. comp. sheets		4.00
Drop forge flashings		5.00
No. 1 busheling		5.00
Hvy. steel axle turnings		6.00
Machine shop turnings	4.00 to	4.50
Knuckles and couplers		10.00
Coil and leaf springs		10.00
Rolled steel wheels		10.00
Low phos. billet crops	10.00 to	10.50
Short shov. steel turnings	5.50 to	6.00
Short mixed borings and turnings	3.75 to	4.25
Cast iron borings	3.75 to	4.25
No. 2 busheling	3.50 to	4.00
Steel car axles	10.00 to	11.00
Iron axles	10.00 to	11.00
No. 1 machinery cast	9.00 to	9.50
No. 1 cupola cast	9.25 to	9.75
Stove plate	7.25 to	7.50
Steel rails, 3 ft. and under	9.50 to	10.00
Cast iron carwheels	8.00 to	9.00
Industrial malleable	7.00 to	7.50
Railroad malleable	7.00 to	7.50
Chemical borings	7.50 to	8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$7.00 to	$7.50
Scrap steel rails	7.50 to	8.00
Short shoveling turnings		4.00
Stove plate		6.00
Steel axles		7.00
Iron axles		7.00
No. 1 railroad wrought	4.50 to	5.00
Rails for rolling	8.00 to	8.50
No. 1 cast		8.00
Tramcar wheels		8.00
Cast iron borings, chem		8.50

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$5.50 to	$6.00
No. 1 heavy melting	5.00 to	5.50
No. 2 heavy melting	4.50 to	5.00
No. 1 locomotive tires	4.75 to	5.25
Misc. stand-sec. rails	5.50 to	6.00
Railroad springs	6.50 to	7.00
Bundled sheets	2.75 to	3.25
No. 2 railroad wrought	4.50 to	5.00
No. 1 busheling	4.00 to	4.25
Cast iron borings and shoveling turnings	2.75 to	3.25
Iron rails	7.00 to	7.50
Rails for rolling	7.00 to	7.50
Machine shop turnings	2.00 to	2.50
Heavy turnings	3.75 to	4.25
Steel car axles	8.25 to	8.75
Iron car axles	11.75 to	12.25
Wrot. iron bars and trans.	5.00 to	5.50
No. 1 railroad wrought	3.50 to	4.00
Steel rails less than 3 ft.	8.50 to	9.00
Steel angle bars	6.00 to	6.50
Cast iron carwheels	5.00 to	5.50
No. 1 machinery cast	6.50 to	7.00
Railroad malleable	4.75 to	5.25
No. 1 railroad cast	5.75 to	6.25
Stove plate	5.50 to	6.00
Relay, rails, 60 lb. and under	16.00 to	16.50
Relay, rails, 70 lb. and over	20.00 to	21.00
Agricult. malleable	5.00 to	5.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$2.85 to	$3.00
No. 2 heavy melting steel		1.50
Heavy melting steel (yard)		1.50
No. 1 hvy. breakable cast	4.50 to	4.75
Stove plate (steel works)	2.25 to	2.75
Machine shop turnings	0.50 to	1.00
Short shoveling turnings	0.50 to	1.00
Cast borings	0.50 to	1.00
No. 1 blast furnace	0.50 to	1.00
Steel car axles	8.00 to	8.50
Iron car axles (nom.)	14.00 to	14.50
Spec. iron and steel pipe	2.00 to	2.50
Forge fire		3.25
No. 1 railroad wrought	4.00 to	4.50
No. 1 yard wrought, long	3.25 to	3.50
Rails for rolling	5.00 to	5.50
No. 1 cast	5.00 to	5.25
No. 2 cast	4.00 to	4.50
Stove plate (foundry)		3.25
Malleable cast (railroad)	3.50 to	4.00
Cast borings (chemical)	6.00 to	6.50

Per gross ton, delivered local foundries:

No. 1 machinery cast	$7.00 to	$7.50
No. 1 hvy. cast (cupola size)	7.00 to	7.50
No. 2 cast	4.00 to	4.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$3.35 to	$3.50
Scrap T rails		3.35
Machine shop turnings	0.80 to	1.00
Cast iron borings		1.05
Bundled skeleton, long	2.00 to	2.10
Forge flashings	3.00 to	3.50
Blast furnace scrap	0.90 to	1.00
Forge scrap	3.00 to	3.25
Shafting	9.50 to	10.00
Steel car axles	9.00 to	9.50
Wrought pipe	4.00 to	4.25
Rails for rolling	4.50 to	5.00
Cast iron borings, chemical	7.00 to	7.25

Per gross ton delivered consumers' yards:

Textile cast	$7.00 to	$7.50
No. 1 machinery cast	7.50 to	8.00
Stove plate	5.00 to	5.25
Railroad malleable	10.50 to	11.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$4.50 to	$5.00
Scrap rails for melting	6.00 to	6.50
Loose sheet clippings	1.00 to	1.50
Bundled sheets	3.25 to	3.75
Cast iron borings	2.75 to	3.25
Machine shop turnings	2.50 to	2.00
No. 1 busheling	3.75 to	4.25
No. 2 busheling	2.00 to	2.50
Rails for rolling	6.50 to	7.00
No. 1 locomotive tires	7.00 to	7.50
Short rails	8.00 to	8.50
Cast iron carwheels	6.00 to	6.50
No. 1 machinery cast	8.50 to	9.00
No. 1 railroad cast	7.50 to	8.00
Burnt cast	3.25 to	3.75
Stove plate	3.25 to	3.75
Agricultural malleable	7.00 to	7.50
Railroad malleable	7.50 to	8.00

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting steel	$4.25 to	$4.75
Borings and short turnings	1.50 to	2.00
Long turnings	1.00 to	1.50
No. 1 machinery cast	7.00 to	7.50
Automotive cast	8.50 to	9.00
Hydraul. comp. sheets	3.25 to	3.75
Stove plate	3.25 to	3.75
New No. 1 busheling	3.25 to	3.75
Old No. 2 busheling	1.25 to	1.75
Sheet clippings	1.25 to	1.75
Flashings	3.50 to	4.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	5.00
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	12.50	10.00
Stove plate	10.00	8.00
Standard carwheels	1.00	8.50
Malleable	10.00	8.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	2.95c.
Squares and flats	3.45c.
Bands	2.95c.
Hoops	3.60c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.15c.
Galv. sheets (No. 24), 25 or more bundles	3.65c.
Hot-rolled sheets (No. 10)	3.10c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	$3.74
Spikes, large	2.50c.
Small	2.75c. to 2.90c.
Boat	3.00c.
Track bolts, all sizes, per 100 count, 70 per cent off list	
Machine bolts, 100 count, 70 per cent off list	
Carriage bolts, 100 count, 70 per cent off list	
Nuts, all styles, 100 count 70 per cent off list	
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd, base per 100 lb.	2.75
Wire, galv. soft, base per 100 lb.	3.20
Common wire nails, per keg	2.35
Cement coated nails, per keg	2.35

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforcing bars, billet steel	1.65c. to 1.75c.
Rail steel reinforcement	1.45c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.00c.
Flats and squares	3.50c.
Bands, $\frac{1}{4}$ in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 22)	3.55c.
Galv. sheets (No. 24)	4.10c.
Hot-rolled sheets (No. 10)	3.20c.
Spikes ($\frac{1}{4}$ in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural	3.75c.
Rivets, boiler	3.75c.

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Coach and lag screws	70
Hot-pressed nuts, sq., tap, or blank	70
Hot-pressed nuts, hex., tap, or blank	70

No. 8 black ann'l'd wire, per 100 lb. $3.45
Com. wire nails, base per keg 2.30
Cement c't'd nails, base per keg 2.30

NEW YORK

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	6.00c. to 6.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.52c.
Flats and squares	4.02c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Hot-rolled sheets (No. 10)	3.00c. to 3.25c.
Hot-rolled ann'l'd sheets (No. 24*)	3.50c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	4.50c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel, $\frac{1}{2}$ x $\frac{1}{8}$ in. and larger	3.40c.
Smooth finish, 1 to $2\frac{1}{2}$ x $\frac{1}{4}$ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Common wire nails, base, per keg	$2.60

	Per Cent Off List
Machine bolts, cut thread:	
$\frac{3}{4}$ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
$\frac{1}{2}$ x 6 in. and smaller	65 to 65 and 10
$\frac{5}{8}$ x 20 in. and smaller	65 to 65 and 10
Boiler Tubes	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.31c.
Hot-rolled annealed sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Hot-rolled sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	3.85c.
Galv. corrug. sheets	4.40c.
Structural rivets	4.00c.
Boiler rivets	4.00c.

	Per Cent Off List
Tank rivets, $\frac{7}{8}$ in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	70
Carriage bolts	70
Lag screws	70
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	70
Less than 200 lb.	60
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	70
Less than 200 lb.	60

PHILADELPHIA

	Base per Lb.
Plates, $\frac{1}{4}$-in. and heavier	2.45c.
Structural shapes	2.45c.
Soft steel bars, small shapes, iron bars (except bands)	2.45c.
Reinforc. steel bars, sq., twisted and deform.	2.30c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats	3.85c.
Steel hoops	3.00c.
Steel bands, No. 12 to 3/16-in., incl.	2.75c.
Spring steel	5.00c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled and annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, $\frac{1}{4}$ in.	5.00c.
Swedish iron bars	5.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

CLEVELAND

	Base per Lb
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex.	2.95c.
Cold-fin. flats and sq.	3.45c.
Flat rolled steel under $\frac{1}{4}$ in.	3.00c.
Cold-finished strip	*3.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann'l'd wire, per 100 lb.	$2.75
No. 9 galv. wire, per 100 lb	3.20
Com. wire nails, base per keg	2.35

*Net base, including boxing and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rails steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex.	3.25c.
Squares	3.75c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.25c.
Hot rolled sheets (No. 10)	3.30c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb	10.25

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.50
4-in.	36.00
Lap-welded steel boiler tubes, 2-in.	16.50
4-in.	34.50

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.65c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.10c.
Bands	3.35c.
Hoops	3.90c.
Hot-rolled sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.45
Black wire, base per 100 lb.	3.20

BOSTON

	Base per Lb.
Plates	*3.35c.
Structural shapes	*3.35c.
Soft steel bars, small shapes	*3.35c.
Reinforcing bars	3.10c to 3.35c.
Iron bars—	
Refined	3.25c.
Best refined	4.60c.
Spring steel, open-hearth	5.00c.
Tire steel	4.50c. to 4.75c.
Bands	*3.75c. to 4.25c.
Hoop steel	4.90c. to 5.40c.
Cold-rolled steel—	
Rounds and hex.	3.50c. to 5.50c.
Squares and flats	4.00c. to 6.00c.
Rivets, structural or boiler	4.80c.

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag screws	70
Hot-pressed nuts	40 and 10
Cold-punched nuts	40 and 10
Stove bolts	70 and 10

*Base price (250 to 999 lb.); less than 250 lb., add 50c. per 100 lb.; 1000 to 7999 lb., deduct 15c.; 8000 to 14,999 lb., deduct 25c.; 15,000 lb. and larger lots, deduct 35c.

PACIFIC COAST

	Base Per Lb. San Francisco	Los Angeles	Seattle
Plates and struc. shapes, $\frac{1}{4}$-in. and heavier	3.25c.	3.30c.	3.00c.
Soft steel bars	3.25c.	3.30c.	3.00c.
Reinforcing bars	3.00c.	3.00c.	3.00c.
Hot-rolled annealed sheets (No. 24)	3.95c.	4.20c.	4.50c.
Hot-rolled sheets (No. 10)	3.50c.	3.50c.	4.00c.
Galv. sheets (No. 24)	4.55c.	4.50c.	5.00c.
Struc. rivets, $\frac{1}{2}$ in. and larger, less than 1000 lb.	5.00c.	5.00c.	4.00c.
Cold-finished steel Rounds	5.50c.	5.50c.	4.50c.
Squares and hexagons	6.75c.	6.75c.	5.75c.
Flats	7.25c.	7.25c.	6.75c.
Common wire nails, base per keg in less carloads	$2.90	$2.90	$2.85 to 3.00

Plates, shapes, bars, bands and hot-rolled sheets, No. 16 gage and heavier, subject to reductions for quantity. Cold-finished quotations based on 100 lb. minimum quantity.

PLANT EXPANSION AND EQUIPMENT BUYING

Machine Tool Trade Extremely Dull

Shutting Down of Many Industrial Plants Accentuates Recent Quietness in Markets

MACHINE tool business generally is so poor that it can turn only one way, and that is upward, but the trade does not look for much of a change during July and August. With the prostrate condition of industry accentuated by the many shutdowns of plants during the first half of July, with some to be closed the entire month, there is naturally little or no interest in the purchase of new equipment.

New models and changes in models by automobile companies during the next few months will call for large expenditures for new tooling, but there are no indications yet that many new machines will be purchased.

Most of the buying of importance the past week or two has been for Government work. Orders for 22 lathes for Wright Field, Army Air Corps, Dayton, Ohio, were placed with two makers, 16 with one and six with the other. The Navy Department is taking new bids on three radial drills for the Brooklyn Navy Yard. Bids on these machines submitted some months ago were rejected. The Navy is also asking for prices on 60 electric hand drills.

Peoria, Ill., has ordered four speed lathes, a small drill press and a bench grinder for a high school. A Western electric fan manufacturer has bought two small presses.

NORTH ATLANTIC

Petrometal Corpn., 33 West Forty-second Street, New York, steel products, has leased former one-story forge shop of United Dry Docks, Inc., Brooklyn, about 20,000 sq. ft. space, for storage and distributing plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 19 for one motor-driven radial drill (Schedule 8352), until July 26 for flexible brass tubing (Schedule 8379), one motor-driven eyeleting machine (Schedule 8353), all for New York Navy Yard.

Metropolitan Cement Corpn., an interest of Edison Cement Co., 261 Fifth Avenue, New York, has plans by company engineer, M. Heintel, for extensions and improvements in former plant of Building Materials Corpn., Raritan Township, N. J., recently acquired for new cement mill. Cost about $500,000 with machinery.

Kleinert Machine Co., Inc., Bronx, New York, has been organized by Herman Kleinert, Jr., and Henry Kleinert, to take over and expand company of same name, operating general machine works at 920 Brook Avenue. New company will specialize in production of air compressors, tools and other machine products.

Super Auto Springs, Inc., New York, has leased floor in building at 22-30 Little West Twelfth Street for manufacture of heavy springs for motor trucks, with department for replacements repairs, etc.

American Safety Razor Corpn., 303 Jay Street, Brooklyn, is increasing operations and is now giving employment to about 50 per cent above normal working quota, due to overtime schedule for new double-edge razor blades, recently placed on market. Manufacture of single-edge razor blades is also being continued.

Utah Pressing Machinery Corpn., New York, has been organized by Louis Utah, 2327 Valentine Avenue, and Edmund Fischel, 1094 Bryant Avenue, both Bronx, to manufacture pressing machines and parts, steam appliances, etc.

John Morrell & Co., 620 West Thirty-sixth Street, New York, meat packers, have awarded general contract to Turner Construction Co., 420 Lexington Avenue, for new two-story packing plant, 75 x 180 ft., at Brooklyn. Cost over $100,000 with equipment. Company headquarters are at Ottumwa, Iowa. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

Apex Products Co., Inc., 10-21 Jackson Avenue, Long Island City, manufacturer of stamped metal products for kitchens, etc., has leased space in building at Fortieth Avenue and Twenty-third Street for new plant.

Hudson Tunnel Iron Works, Inc., New York, has been organized by Carl Martin, Suffern, N. Y., and William Heber, Congers, N. Y., to take over and expand company of same name at 171 Spring Street, manufacturer of ornamental and other iron products.

Board of Transportation, 250 Hudson Street, New York, asks bids until July 22 for armored motor car equipment and motor truck equipment for operating division of municipal subway.

Home Fuel Oil Co., 18 West Palisade Avenue, Englewood, N. J., has plans for one and two-story bulk oil storage and distributing plant. Cost about $60,000 with tanks and equipment. William G. Moore is general manager.

Edison-Splitdorf Corpn., 51 Lakeside Avenue, West Orange, N. J., has been organized by interests identified with Thomas A. Edison, Inc., same address, to manufacture electrical appliances and equipment. William L. Ramage, 15 Ashwood Terrace, West Orange, is one of the incorporators.

C. A. Goldsmith Co., Inc., 270 Thomas Street, Newark, manufacturer of bronze, aluminum and other metal castings, is running on a five-day week schedule, with employment close to normal working force.

Woburn Degreasing Co., 1200 Harrison Avenue, Kearny, N. J., manufacturer of oils, grease, etc., has purchased one-story plant of former Zenitherm Co., on adjoining site, for expansion.

Philadelphia Electric Co., Tenth and Chestnut Street, Philadelphia, has approved plans for addition to Richmond generating station on Delaware River, including installation of a 165,000-kw. turbo-generator unit and auxiliary equipment. Equipment installation will cost about $5,472,000. Westinghouse Electric & Mfg. Co. has been awarded contract for prime mover and will build unit at its South Philadelphia Works; awards for miscellaneous equipment will be made soon. Project is scheduled for completion in 1934.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 19 for one motor-driven turret lathe (Schedule 8354) for Philadelphia Navy Yard.

Department of Supplies and Purchases, City Hall, Philadelphia, Joseph H. Hagedorn, director, asks bids until July 18 for hydraulic press cylinders (Class 227) and crane chain (Class 228).

Reading Iron Co., Reading, Pa., has resumed operations at plant at Danville, Pa., following curtailment for several weeks, giving employment to about 250 men.

Standard Oil Co. of Pennsylvania, Ledger Building, Philadelphia, has plans for new bulk oil storage and distributing plant at Scranton, Pa., including tanks, pumping plant and other units. Cost close to $200,000 with equipment.

Fishback Foundry & Engineering Corpn., Pottsville, Pa., has been organized by John T. Hoffman and William E. Oakley, 622 North Centre Street, to manufacture iron and other metal castings, including machining and finishing work.

Harris-Denly Coal Co., Exeter, Pa., plans rebuilding breaker at anthracite coal properties recently destroyed by fire. Loss over $40,000 with equipment.

Worthington Pump & Machinery Corpn., Clinton and Roberts Streets, Buffalo, has filed plans for one-story addition for storage and distribution. Company is carrying out consolidation at local works, transferring air compressor manufacturing division from Cincinnati, to be operated in conjunction with oil and gas engine department at Buffalo plant.

Pierce, Butler & Pierce Mfg. Co., 282 James Street, Syracuse, N. Y., manufacturer of boilers, radiators and other heating equipment, has resumed production at local works on four-day week basis, following shutdown since last March. Manufacture has been stepped up at branch plant at Oswego, N. Y., with operations on full time schedule.

Paramount Refining Co., Inc., Niagara Falls, N. Y., has been organized by William L. Salacuse, 1914 Pine Avenue, and associates, to manufacture lubricating and other processed oils.

Beckley Perforating Co., Garwood, N. J., reports a steady increase in business which has brought its production to a fairly satisfactory rate.

Tolhurst Machine Works, Inc., Green Island, N. Y., has purchased Sweet & Doyle Foundry & Machine Co., same place. Equipment of Tolhurst plant has been moved to Sweet & Doyle foundry. Activities of combined company will include general machine shop work, gray iron castings, pattern work, etc.

CENTRAL DISTRICT

Pittsburgh & Lake Erie Railroad Co., P. & L. E. Terminal Building, Pittsburgh, asks bids until July 20 for air brake and train air-signal equipment and maintenance materials. J. H. James is purchasing agent.

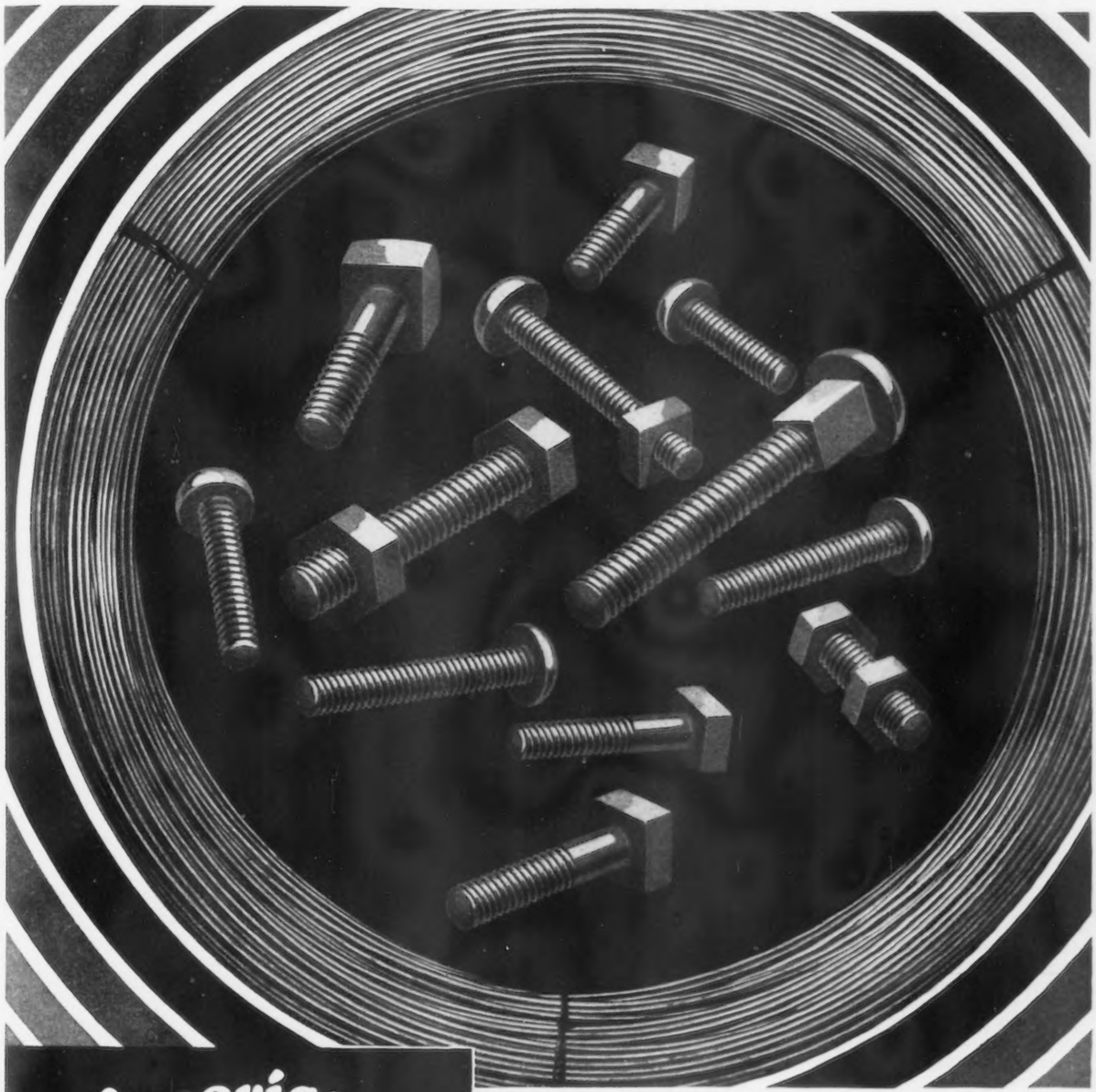
Lehigh Portland Cement Co., Allentown, Pa., is arranging for early resumption of operations at branch mill at New Castle, Pa., closed several months ago.

Hammermill Paper Co., East Lake Road, Erie, Pa., has rejected bids recently received for one-story addition, 130 x 260 ft., and will ask new bids later on revised plans. Cost about $100,000 with equipment.

Dravo Contracting Co., Neville Island, Pittsburgh, has secured contract from Atlantic, Gulf & Pacific Co., New York, for 8-ton stiff-leg derrick, with steel deck house, machinery, etc., for scow. Company is also building a steel derrick scow for same company. Operations are being increased at shipyard, where first of two stern wheel suction dredges is in course of construction; work on second dredge will begin soon.

Valley Mould & Iron Co., Sharpsville, Pa., has resumed operations following shut-down for several months. About 150 men have been reinstated.

Quaker State Oil Refining Co., Oil City, Pa., has awarded contract to Foster-Wheeler Corpn., 165 Broadway, New York, for expansion at local refinery, with installation of cracking



American QUALITY Steel & Wire Company

COLD HEADING WIRE

RESULTS You Know Beforehand

Needless to say, your product can be no better than the material from which it is fabricated. The complete control exercised by this Company over every step in the production of Cold Heading Wire in carbon steels and alloys is your assurance of complete satisfaction.

By this same control, we are better able to give your individual requirements the attention you expect. Specify "American Quality" on your next order—and KNOW results beforehand.

1831 MORE THAN 100 YEARS of PROGRESS in WIRE MAKING 1932

AMERICAN STEEL & WIRE COMPANY

208 South LaSalle Street, Chicago — SUBSIDIARY OF UNITED STATES STEEL CORPORATION — And All Principal Cities

Pacific Coast Distributors. Columbia Steel Company, Russ Building, San Francisco — *Export Distributors:* United States Steel Products Company, New York

and other machinery for gasoline production. Cost about $100,000 with equipment.

American Steel Foundries, Inc., Alliance, Ohio, has resumed operations at local plant, following curtailment for several weeks. Over 200 men will be employed.

Armorsteel Roadguard Co., Cleveland, has been organized by H. B. Wike and J. H. Lesh, 15303 Lake Avenue, to manufacture steel products for road and highway service. Company will be represented by Goulder, White, Garry & McCreary, Union Trust Building.

Cheney Pulp & Paper Co., Franklin, Ohio, will soon begin superstructure by day labor for two-story addition, 60 x 100 ft., to replace unit recently destroyed by fire. Cost about $45,000 with equipment.

Niles Taxpayers League, Niles, Ohio, is at head of project to build a municipal electric light and power plant. C. W. Robinson, Niles, is interested in project.

Hayden Furnace & Sheet Metal Co., East Cleveland, has been organized by J. A. Weyer, 13237 Superior Avenue, and Rudolph Mirl, 3106 Essex Road, Cleveland, to manufacture furnace specialties and sheet metal products.

F. W. Wakefield Brass Co., Vermilion, Ohio, manufacturer of lighting fixtures, brass stampings and kindred products, has asked bids on general contract for one-story addition, increasing present floor space about 20 per cent. Cost about $40,000 with equipment.

Ohio Bell Telephone Co., 42 East Gay Street, Columbus, Ohio, has approved plans for additions to four local exchange stations, including improvements in present units, each to cost close to $100,000 with equipment. Robert R. Reeves and Orlando C. Miller, 203 East Broad Street, are architects. Main offices are at 750 Huron Road, Cleveland.

Board of Education, Willoughby Rural School District, Willoughby, Ohio, will install manual training equipment in one-story and basement addition to Longfellow school, for which general contract recently was let to Payne & Beymer, Painesville, Ohio. Cost about $100,000. Fulton & Taylor, 8120 Euclid Avenue, Cleveland, are architects.

Guide Lamp Corpn., 1637 West Twenty-fifth Street, Anderson, Ind., manufacturer of automobile lamps, reflectors, etc., will build one-story addition, 50 x 100 ft. New boiler plant will be installed. Cost over $35,000 with equipment.

Johnson Air Conditioning Corpn., Crown Point, Ind., has been organized by A. J. Johnson and K. E. Whitman, both Crown Point, to manufacture air-conditioning equipment and systems.

Wabash Cabinet Co., Wabash, Ind., manufacturer of radio cabinets and equipment, is running close to normal, with working quota of 300 persons.

Indiana State Highway Commission, State House Annex, Indianapolis, J. J. Brown, director, asks bids until July 26 for one-story equipment storage and service building at Bloomington, Ind. Vonnegut, Bohn & Mueller, Indiana Trust Building, Indianapolis, are architects. Bids have been received for similar units near Anderson and Bluffton, Ind.

Long Mfg. Co., 2768 East Grand Boulevard, Detroit, manufacturer of automobile radiators, clutches, etc., has filed plans for one-story addition, including improvements in present works. Cost about $30,000 with equipment. George V. Pottle, First National Bank Building, is architect.

American Blower Corpn., 6000 Russell Street, Detroit, has organized Hydraulic Coupling Corpn., a subsidiary, capital $25,000, to manufacture hydraulic couplings and kindred mechanical equipment.

Department of Municipal Waste, 2655 Franklin Street, Detroit, is completing plans for four city-owned incinerator plants. Total cost about $2,000,000 with power and other equipment. Joseph Stringham, City Hall, is city engineer.

McCord Radiator & Mfg. Co., 2587 East Grand Boulevard, Detroit, manufacturer of automobile radiators, is increasing production schedule for improved type radiators for new Ford automobiles. Company is also manufacturing radiators for Hudson and Essex and other popular-priced automobiles.

Anaconda Wire & Cable Co., Muskegon, Mich., an interest of Anaconda Copper Mining Co., is running on 24-hr. day schedule, five-day week, giving employment to about 200 workers.

Michigan Collapsible Tube Co., 11237 Mack Avenue, Detroit, has been organized by Godfried Heizman, 4613 Beniteau Street, and associates, to manufacture collapsible metal tubing and kindred products.

Flint Tire & Rubber Co., 920 Walnut Street, Flint, Mich., recently organized by B. F. Martin, 1301 East Hamilton Avenue, and associates, plans establishment of plant for manufacture of automobile tires, including new type of semi-rigid tire tube and casing, and department for tire rebuilding. Other rubber goods will be manufactured later.

Haban Saw & Mfg. Co., 3811 Colerain Avenue, Cincinnati, recently organized, is operating a plant at this address for manufacture of band and meat saws. Company is also agent for Ohlen-Bishop Co., Columbus, Ohio.

Elmwood Casting Co., Cincinnati, will be dissolved and affairs liquidated, according to agreement with shareholders owning more than 90 per cent of the 1840 shares of outstanding stock.

MIDDLE WEST

Board of City Commissioners, Belvidere, Ill., is planning installation of a municipal electric light and power plant. Cost over $85,000 with equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

Twin City Iron & Wire Co., 21-35 West Water Street, St. Paul, Minn., has asked bids on general contract for rebuilding part of two-story and basement plant recently destroyed by fire. Cost about $30,000 with equipment.

Omaha Bellevue Airport Co., Omaha, Neb., care of William J. Hotz, 1530 City National Bank Building, head, has acquired site for new airport in Bellevue district and will have plans drawn for hangars with repair facilities, oil storage building and other units.

Bentson Mfg. Co., Aurora, Ill., has been organized to take over and expand local company of same name, manufacturer of metal filing cabinets and kindred equipment. John and Henry G. Bentson head new organization.

Construction Service, Veterans' Administration, Washington, asks bids until Aug. 16 for refrigerating and ice-making machinery, heating and ventilating equipment, electric distribution system and other mechanical equipment for institution at Cheyenne, Wyo.

Swift & Co., Union Stock Yards, Chicago, will soon begin erection of one-story packing plant at Spencer, Iowa. Cost about $40,000 with equipment.

Blackhawk Stoker Corpn., 1269 Blanche Street, Chicago, has been organized by Arthur B. Behrendt and C. J. Vance to manufacture automatic coal stokers and parts, heat control equipment and kindred products.

Ash Grove Lime & Portland Cement Co., Fairfax Building, Kansas City, Mo., has resumed operations at cement mill at Louisville, Neb., following shutdown for four months, and will give employment to about 100 men.

Construction Machinery Co., Waterloo, Iowa, has been organized by P. L. and L. B. Bryant, Waterloo, capital $100,000, to manufacture heavy machinery and construction equipment.

United States Engineer Office, Rock Island, Ill., will receive bids until Aug. 3 for hydraulic turbine and generator unit with automatic control, stand-by gas-electric power equipment with tanks, switchboard and accessories; lock-gate machines with gears, motors, etc.; valve machines with gears, sprocket chain, motors, limit switches, motor-operated brakes, etc.; transformers and transformer room equipment, power feeders and other electric and control equipment, for work at Mississippi lock and dam No. 15, Rock Island.

Phoenix Metal Cap Co., 2444 West Sixteenth Street, Chicago, is new name adopted by Phoenix Hermetic Co. Change is made to better describe product and field served.

Pollard Brothers Mfg. Co., manufacturer of steel factory equipment, has moved from 4034 North Tripp Avenue, Chicago, to one-story building at 4444-46 North Knox Avenue. New plant will provide 1500 sq. ft. of additional floor space and greatly improved manufacturing facilities.

Racine, Wis., Board of Vocational Education, 800 Center Street, closes bids July 14 for completion of south wing unit, 62 x 122 ft., four stories, of vocational school started in 1931, and will purchase complete equipment about Aug. 15. T. E. Rees is director.

Milwaukee Board of School Directors, 1110 North Tenth Street, will take bids after Aug. 1 for new boiler house, with 100-ft. brick stack, at Brown Street School. Improvement will cost from $40,000 to $50,000. M. H. Anderson is acting secretary of board.

American Welding & Cutting Co., 1635 North Thirty-first Street, Milwaukee, is taking additional space adjoining its plant for production welding.

Harnischfeger Corpn., 4401 West National Avenue, Milwaukee, has booked order from State of California Highway Department for three Diesel-powered excavators aggregating about $65,000. Business in June was best for any month this year, according to Donald B. Patterson, vice-president.

Village of Kohler, Wis., William Nesemann, clerk, closes bids July 18 for erection and equipment of municipal sewage disposal plant and garbage incinerator costing about $85,000. Jerry Donohue Co., Sheboygan, Wis., is consulting engineer.

City of Lake Mills, Wis., has authorized expenditure of $22,000 for erection and equipment of municipal sewage disposal plant. W. G. Kirchhoffer, 22 North Carroll Street, Madison, Wis., is consulting engineer. H. F. Kell is city clerk.

Common Council, Richland Center, Wis., has engaged Commercial Testing & Engineering Co., 360 North Michigan Avenue, Chicago, to prepare specifications and supervise installation of new 500-hp. water tube boiler in municipal light and power plant. Date of bids on equipment will be fixed later. Guy L. Luckey is city clerk.

Bryant Machinery & Engineering Co., Chicago, announce the employment of a number of exclusive agents. G. A. Richey, Chamber of Commerce Building, Indianapolis, has been appointed to the Indianapolis territory. Thomas M. Rees, for many years identified with the machine tool industry in Pittsburgh territory, is the new agent in that district, with offices at 18 Fancourt Street, Pittsburgh. D. E. Dony, 1115 Bay Street, Rochester, N. Y., will serve the Bryant company in the Rochester territory. A. L. Bechtel, for many years vice-president and chief engineer of the Cleveland Punch & Shear Works Co., and now head of the A. L. Bechtel Machinery Co., 2848 Woodbury Road, Shaker Heights, Cleveland, has the Bryant company's agency in the Cleveland territory.

SOUTH CENTRAL

Dixie Mfg. Co., Mobile, Ala., manufacturer of orchard stoves, parts, etc., has acquired factory at Congress and Conception Streets for new plant.

American Paint Works, 428 Josephine Street, New Orleans, has plans for two two-story additions to present five-story factory, 40 x 120 ft. and 40 x 100 ft., respectively. Cost over $70,000 with equipment. Rathbone DeBuys, Hibernia Building, is architect.

Southern Railway Co., Knoxville, Tenn., has adopted four-day week at local repair shops to give employment to about 1200 men.

State Board of Education, Capitol Building, Nashville, Tenn., will soon take bids on general contract for one-story two-section building, 124 x 145 ft., at Tennessee Agricultural and Industrial College, Nashville. Cost over $75,000 with equipment. Granbury Jackson, Jr., 220 Capitol Boulevard, is architect.

Gulf States Crate Co., Amite, La., care of H. S. Weigle, Amite Bank & Trust Co., Amite, now being organized by Mr. Weigle and associates, plans mill for manufacture of fiberboard cups, plates and kindred products. Company will have capital of $250,000. Cost of plant over $50,000 with machinery.

SOUTHWEST

Construction Service, Veterans' Administration, Washington, asks bids until Aug. 2 for power plant equipment for institution at Leavenworth, Kan., including boilers and auxiliaries, outside steam, water and sewer distribution systems, etc.

Wilcox Oil & Gas Co., Chanute, Kan., has approved plans for new bulk oil storage and distributing plant. Cost about $40,000 with equipment. D. W. Whitlow is division manager.

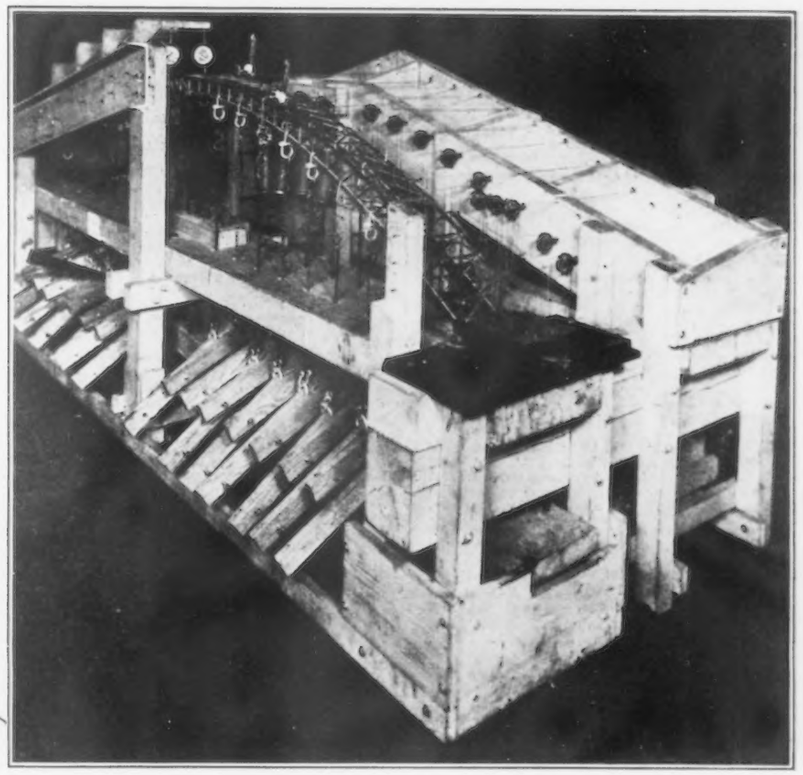
Laclede Stoker Co., St. Louis, has been organized, capital $300,000, to take over and expand company of same name at 4438 Hunt Street, manufacturer of stokers, parts and kindred equipment. Henry F. Welsch is one of principal incorporators.

Shell Petroleum Corpn., Shell Building, St. Louis, through Shell Oil Co. of Canada, Ltd., Toronto, affiliated organization, plans new bulk oil storage and distributing plant at Port Stanley, near London, Ont. Cost close to $100,000 with equipment.

Sewall Paint & Varnish Co., 1009 West Eighth Street, Kansas City, Mo., manufacturer of paints, oils, varnishes, etc., has let general contract to George Hucke & Sons, 1704 Baltimore Avenue, for rebuilding one-story plant unit recently destroyed by fire. Cost about $50,000 with equipment.

Betz Unit Air Cooler Co., Kansas City, Mo., has been organized to take over and expand company of same name at 6 West Ninth

. . . TESTING A BRIDGE



Before It Was Built

Pioneering in the realm of the impossible—Southwark many times has offered the means of blazing new trails in scientific endeavor.

One able example was the designing of the Kill Van Kull span, the longest arch span in the world, crossing New York Harbor from Bayonne, N. J., to Port Richmond, Staten Island.

Before a single member of the span was assembled—when the project was still on the drawing board—an exact scale model of the proposed central span was constructed from engravers brass. As a final check of the intricate mathematical calculations used in this span before the many tons of steel were actually fabricated, this miniature model was ingeniously arranged so that it could be subjected to loads and stresses simulating those the finished span was expected to encounter. One type of instrument of large importance in the minute measurements of movement in this model was the Huggenberger Tensometer.

The scope of Southwark mechanical testing instruments and equipment knows no bounds. From the largest universal testing machine in the world to diminutive devices that may be held in the palm of the hand—Southwark instruments may be found in the laboratories of leading technical schools, research institutes, government bureaus and progressive manufacturers. They may be found in the field—testing pipe, dams, bridges, power line towers, railroad cars, ships and aircraft while in motion, etc. Everywhere, they are performing an almost countless number of vital services to Industry, Transportation, Engineering and Research.

That is why, throughout the world, Southwark represents the greatest assemblage of experience, engineering talent and manufacturing resources ever devoted to the development of testing equipment.

BALDWIN-SOUTHWARK CORP.
SOUTHWARK DIVISION
PHILADELPHIA
Pacific Coast Representatives: The Pelton Water Wheel Co., San Francisco

SOUTHWARK

Street, manufacturer of air-conditioning equipment, parts. E. M. Metcalf is one of principal incorporators.

Common Council, Osage City, Kan., plans installation of pumping machinery and other power equipment in proposed sewage disposal plant. Cost over $40,000 with equipment. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

Construction Quartermaster, Fort Leavenworth, Kan., asks bids until July 20 for gasoline fueling system.

Shippers Compress Co., 4410 Clinton Drive, Houston, Tex., operating a cotton compressing plant, has awarded contract to J. B. Townsend, Post-Dispatch Building, for one-story addition, 232 x 420 ft., for storage and distribution.

State Metallizing & Engineering Corpn., Fort Worth, Tex., has been organized by R. N. Dumble and F. C. Roderus, both Fort Worth, to manufacture metal products.

Line Independent School District, Gladewater, Tex., J. W. O'Bannon, superintendent of schools, plans manual training department in new two-story high school. Bids soon asked on general contract. Cost over $100,000. Voelcker & Dixon, Inc., Wichita Falls, Tex., is architect.

NEW ENGLAND

General Electric Co., Pittsfield, Mass., is increasing production schedule at local plant, reinstating a number of employees. Output will be devoted primarily to new oil-burning furnace unit, soon to be marketed by company.

Roslindale Auto Body, Inc., Roslindale, Boston, has been organized by George Kuketz and Theodore B. Thoben, 500 Poplar Street, to manufacture commercial automobile bodies.

Construction Service, Veterans' Administration, Washington, asks bids until Aug. 2 (postponed from July 19) for new boiler plant and utility building at institution at Togus, Me.

New England Telephone & Telegraph Co., 50 Oliver Street, Boston, let general contract to J. F. Fitzgerald Construction Co., 38 Chauncy Street, for two-story and basement addition to Aspinwall exchange building, 35 x 165 ft., with L-extension. Cost about $85,000 with equipment.

Erving Paper Co., Erving, Mass., is considering an addition to mill, to cost over $45,000 with equipment. It is expected to begin work in fall. Raymond E. Palmer, 58 Suffolk Street, Holyoke, Mass., is engineer.

Eastern Smelting & Refining Corpn., Boston, has been organized to take over and expand Eastern Smelting & Refining Co., with plant at 109 West Brookline Street. George Fisher is president and treasurer of new company.

Berst-Forster-Dixfield Co., Grand Central Terminal, New York, manufacturer of turned wood specialties, has plans for two-story addition to mill at Dixfield, Me., 130 x 150 ft., for storage and distribution. Two other one-story operating units will be built, 27 x 43 ft. and 30 x 42 ft. Cost over $45,000 with equipment. H. F. Hallock, 28 Montcalm Street, Oswego, N. Y., is architect and engineer.

Thompson Wire Co., 41 Mildred Avenue, Boston, is making repairs to its plant and contemplates purchase of some equipment.

Norton Co., Worcester, Mass., has acquired common stock of Pike Mfg. Co., Pike, N. H., abrasives, and will operate under name of Norton Pike Co., with main offices at Worcester. Executive offices will continue at Pike.

SOUTH ATLANTIC

Board of District Commissioners, District Building, Washington, asks bids until July 19 on general contract for new school unit at Industrial Home for Colored, Blue Plains.

Enterprise Sheet Metal Works, Inc., 718 West Redwood Street, Baltimore, has been organized by George Trautner, 613 South Potomac Street, and associates, to manufacture sheet metal goods.

Virginia Public Service Co., Charlottesville, Va., plans rebuilding part of power plant at Bremo Bluff, Va., recently destroyed by fire. Loss over $150,000 with equipment.

John T. Mann, Orlando, Fla., is at head of project to build and operate one-story electric-operated pre-cooling plant. Cost about $25,000 with machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 19 for water gage fittings (Schedule 8337) for Norfolk Navy Yard, two oscillator generators (Schedule 8343) for Washington Yard; until July 26 for motor-driven pipe-cutting and threading machines and six sets of spare brushes (Schedule 8368) for Brooklyn, Philadelphia, Mare Island and Puget Sound yards, welding rods (Schedule 8371) for Eastern and Western yards, oil-burning lanterns including deck and hand units (Schedule 8369) for Brooklyn Navy Yard; until Aug. 2 for 13 electric drills for Boston Navy Yard, 40 for Brooklyn, 10 for Philadelphia, 8 for San Diego, 35 for Mare Island and 21 for Puget Sound navy yards (Schedule 8375), gasoline torches for Boston, Brooklyn and Mare Island navy yards (Schedule 8373).

White Transportation Co., 407 South Sharp Street, Baltimore, operating fleet of motor trucks, has purchased former plant of American Ice Co., on site 197 x 412 ft., and will use in part for motor truck mechanical plant for repairs, servicing, parts, etc.

Bayard H. Storm, 2219 Sherwood Avenue, Charlotte, N. C., is in the market for used machine tools, including millers, planers, gear hobbing machines, drilling machines, boring mills and shapers, also small tools and accessories for equipping a new machine shop. Purchase of a complete plant would be considered.

PACIFIC COAST

City Clerk, City Hall, Pasadena, Cal., asks bids until July 26 for equipment for Pine Canyon Dam project of city, including hydraulic-operated gate valves, needle valves, welded steel pipe, 48- to 95-in., diameter caterpillar gates with hoists, cables, etc., caterpillar gate frames and other equipment. Total cost, $200,000. S. B. Morris is chief engineer and general manager, power dam project.

Victorville County Water District, Victorville, Cal., plans installation of electric-operated pumping plant on Mojave River for irrigation service.

Washington Iron Works, 4100 South Alameda Street, Los Angeles, has awarded general contract to Pozzo Construction Co., 421 Macy Street, for rebuilding two-story shop unit recently damaged by fire. Arlos R. Sedgley, Architects' Building, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 19 for one 25-ton locomotive crane for Mountain View, Cal., (Schedule 8335), two motor-driven engine lathes (Schedule 8344), and 25,000 ft. twisted pair telephone cable (Schedule 8350) for Puget Sound Navy Yard; until July 26 for 829 steam and water valves (Schedule 8365), screw type pumping unit (Schedule 8349) and 84,000 lb. admiralty metal condenser tubes (Schedule 8372) for Mare Island Navy Yard.

Pacific Air Conditioning Corp., Los Angeles, care of Paul J. Fritz, 502 Union Bank Building, has been organized by H. S. McClelland and Lester A. Todd, Los Angeles, to manufacture air-conditioning equipment and systems.

Mountain States Power Co., Tacoma, Wash., has acquired water rights at Stayton, Ore., and plans early construction of a hydroelectric power plant to replace a generating station recently destroyed by fire. Cost about $50,000. J. K. Jorgenson, Medford, Ore., is company construction engineer.

J. C. Van Orsdel, Salome, Ariz., is at head of project to build an electric light and power plant for service at Salome, Hope, Wenden and neighboring points in Yuma County. Water system, with electric-operated pumping plant, will also be installed.

FOREIGN

Swedish Co-operative Association, Gislaved, Sweden, Gosta Gislow, director, has approved plans for a new rubber mill at Istanbul, Turkey, where site has been acquired. Cost over $500,000 with machinery. Gosta Korner, engineer for organization noted, will be in charge.

London, Midland & Scottish Railway Co., Ltd., London, England, is planning construction of 130 locomotives in shops at Crewe and Derby, England, this year, and will soon purchase equipment, parts, etc.

Public Works and Tenders Committee, Wellington, New Zealand, asks bids until Sept. 15 for transformers, relays, spare parts and miscellaneous electrical equipment.

Metal Box Co., Ltd., London, England, affiliated with Continental Can Co., 1 Pershing Square, New York, is arranging for expansion to provide for minimum output of 100,000,000 cans and containers this year, compared with 65,000,000 such units in 1931. Company is operating 18 plants in Great Britain at present time.

Hirsch, Kupfer & Messingwerke, A. G. (Hirsch Copper & Brass Corpn.), Berlin, Germany, is organizing new brass manufacturing company, capitalized at 12,500,000 m. (about $2,942,500), to carry out expansion and development program. Parent company has arranged for reduction in capital from 12,000,000 to 970,000 m.

Western Wire Products Co., St. Louis, has removed its office and plant to 1415-35 South Eighteenth Street.

Steel Treating Materials Co., 1321-1329 West Pierce Street, Milwaukee, has been organized to deal exclusively in supplies used in steel treating. Ray Thiesenhusen, formerly treasurer, sales manager and director of Wesley Steel Treating Co., Milwaukee, and for the past year chairman of the Milwaukee chapter, American Society for Steel Treating, is president of the new company.

Pathways Back to Prosperity

(Concluded from page 63)

mistakes of modern capitalism, the trend to big business, etc.

The author cites many examples of social injustice and other abuses in our economic and industrial history of the nineteen hundreds—so many, indeed, that the reader is led to ask why seek any "pathways back" to that sort of prosperity. He is assured, however, that "the economic changes which are a contributing cause of this depression are actually a vast benefit to the world, and not an injury if only we can deal with them wisely."

There will be disappointment to any who turn to this book to find a definite program for legislators or a plan for concert by captains of industry and finance, to give us prosperity. Sundry suggestions are in quite general terms. "We must find some better means" of doing this or that. We must have a more general distribution of the wealth our machines are creating: the wage earner must have a larger share. And then we come upon the truism that there is but "one way whereby we can make a market for our huge surplus of goods" and that is "by increasing consumption." But over against this is the author's repeated call for a return to simpler modes of living—which means a lessened demand for consumption goods at the same time that, as he especially emphasizes, the industries dependent on construction (capital goods) have been coming to a standstill! Certainly a combination whose further effects are not pleasant to contemplate.

Some implications of Mr. Baker's view that *the* era of construction is over will meet prompt dissent. One era of construction may have ended, but a succeeding era of other construction is to be looked for unless we grant that invention is no more and that what we have called the advance of civilization is to turn into a protracted camp of occupation. The chapter on the small industry is particularly interesting and will have an appreciative reading, as opinion grows in support of the greater effectiveness of the moderate-sized organization and the better morale of the smaller manufacturing town.

A. I. FINDLEY

COKE REPLACES CHARCOAL

COKE, when it replaced charcoal for smelting iron ore relieved the iron industry from fuel shortage and started it on the road to greatness. The process of carbonizing coal, or coking it, did not originate with the iron trade, however, but came as a health measure. ››› Early Britons considered coal burning unhealthful because of the gases liberated. Queen Elizabeth, in 1550, prohibited coal fires in London during parliament sessions, lest the health of the "knights of the shire" might suffer. Coke was developed as a fuel for open fire places because coking removed sulphur from the coal. ››› In 1619 Dud Dudley, son of Lord Dudley, tried to smelt iron ore with coke. The attempt was moderately successful but the charcoal burners, fearful for their jobs, destroyed the works and the idea was abandoned. ››› In 1740, when charcoal scarcity threatened the iron industry Abram Darby, at Coalbrookdale, used coke successfully and from that time iron progressed. ››› Coke was first made in open piles and the beehive furnace came into use in 1764.

Interlake Iron Corporation operates 502 coke ovens in its modern by-product plants, having a yearly capacity of 2,050,000 net tons of coke for blast furnace, foundry and domestic uses; and in addition to chemical by-products it supplies billions of cubic feet of gas to its communities.

INTERLAKE IRON CORPORATION

PIG IRON ✓ COKE

PICKANDS, MATHER & COMPANY, Sales Agents

CLEVELAND ✓ CHICAGO ✓ DETROIT ✓ ERIE

Wire Drawing Ten Centuries Old

(Concluded from page 61)

est sort of iron smelted direct from the ore in small charcoal fires and recovered in crude lumps mixed with slag and dirt. For some centuries it was conceded that wire drawing made greater demands on quality than any other iron working process and the wire mills got the cream of the production. This iron was hammered into bars ½ in. round, 6 or 8 or 10 ft. long, and drawn to wire as described. A contemporary practice was the forging of larger lumps of iron into flat bars, ⅜ to ½ in. thick and 4 or 5 in. wide, from which strips were split off by hand with chisels, and reheated and rounded up with hammer and anvil.

Rolling Mills Fought It Out with Hammers

Between 1500 and 1600, high speed hammers became available. These were trip hammers driven from cams on water wheel shafts and they could forge strips 1 x ¼ in. and 10 ft. long which could be split into rods ¼ in. square. Two pounds was a good unit weight in those days. Rolling mills crept very quietly into the wire industry and fought it out with hammers for 200 years. The first rolling mills were of course driven from water wheels and were used as slitting mills with collared rolls to divide the forged flats into square rods. There was much argument at the time regarding the quality of wire made from various types of rod. The conservatives claimed that splitting a bar took all the life out of it. As late as 100 years ago, the best authorities maintained that while slit or rolled rods were usable for certain purposes, the only safe and reliable raw material for wire was a hammered bar.

Conditions When America Was Being Settled

About the time of the early settlement of America, rods of iron were being produced both by hammering and by a slitting mill and were cleaned by hand. They were drawn in straight pieces down to 15 or 16 gage, the weight ranging from 2 to 7 lb. The number of drafts was five to six times our present practice for the same reduction, and annealing was done about every three drafts. Fine wire was drawn on blocks, one block per man, and the block was turned by a hand crank mounted either on the edge of the block or on the top of its spindle.

About 1670, the fine wire blocks began to be hooked up to water power but hand operation persisted for 150 years longer. The regular organized wire mills drew coarse wire only, and sold it at about No. 16 gage as a semi-product to individual wire drawers who finished it on hand blocks in their homes. In 1734 the most advanced practice was to get the wire onto blocks at 14 gage. These were power driven blocks to some extent but No. 14 gage was well within the capacity of the hand driven block since the drafts were light, the blocks 12 or 13 in. in diameter and the cranks sometimes two and three times the block radius.

This matter of getting wire onto blocks at as large a gage as possible was frequently discussed. Evidently a demand was growing for finished product in larger sizes and the grip marks were getting troublesome. At about this time a very fast tilt hammer was brought out, one that would do about 200 blows a minute, driven by cams on a large water wheel shaft and rods in 10 or 12 ft. lengths could be forged down to ¼ in.

Big Advance Made in France in 1728

In 1728 a Frenchman by the name of Fleuer made quite a stir in the wire industry. He seems to have been the first to make a study of layout for production and the first to make time studies and calculations. As a result of his studies, he began to discuss the possibility of producing rods by rolling and in such length and diameter that they could go directly onto a bull block. This was a startling proposal.

Mr. Fleuer was about three generations ahead of his time. No one listened to him. He did make some progress however. He forged a rod in the shape of a sharp oval and gave it four passes in a pair of grooved rolls to a 5/16-in. round. He pushed up the production of rods per man to ten times the best previous figure and his rod and wire operation was so successful that within a few years France, which had had no wire industry for fifty years, began to bother the neighboring countries with an exportable surplus. Mr. Fleuer had started something.

In 1769 an English patent was granted to a Mr. Ford, on a rod mill consisting of several stands coupled together and his application described the looping of the first end. There is no record of such a mill having been built. The orthodox wire mills were still relying on hammered bars and those who were more daring took a long chance on slit bars.

First Modern Note in Rod Production

In 1828 we get the first modern note in rod production. Karsten describes at that time the existing practice of hammering and slitting, concedes that there has been some experiment in the direction of finishing in grooved rolls both hot and cold, concedes the advantage of the smooth and accurate product of a rolling mill and reproduces a drawing of what looks like a real rod mill. His picture shows a three-high roughing stand with rolls grooved to start a 1-in. square iron billet and a couple of alternate two-high finishing stands clearly intended for looping. The speed is stated to be 250 r.p.m. and the product a 5/16-in. rod rolled in 7-lb. bundles, coiled on a reel and taken to a bull block to be broken down in coils. The interesting thing about this mill is that it places three-high rolling 28 years ahead of the work of John Fritz at Cambria, whom most of us have always regarded as the father of three-high rolling.

These rolled rods came into use very slowly, but in 1832 there is a record of rods being rolled down to 9/32 in. In 1845 rolled rods were the standard raw material. The 1-in. square billet had grown to a length of 5 ft. and the most advanced mills were doing 3,000 lb. a day of 5½ gage in 17-lb. bundles. The principles had been satisfactorily worked out and progress between 1845 and 1860 was rapid and in 1862 the first continuous rod mill went into operation. The rapid development of the continuous mill was vastly aided by the development at this time of the Bessemer and open-hearth processes which gave the rod makers for the first time a metal that would stand heavy reductions and slight pulls between passes.

Fabricated Steel Awards Gained in May

Bookings of fabricated structural steel in May by 259 establishments, reporting to the Bureau of Census, rose to 81,588 tons from 58,742 tons in April, reported by 266 plants. Estimated orders were 90,800 tons and 64,800 tons, respectively.

"The Corrosion of Metals by Milk" is the title of a pamphlet by Dr. Colin G. Fink and Frederick A. Rohrman of Columbia University, New York.

Tolerance 3/10,000 of an inch—

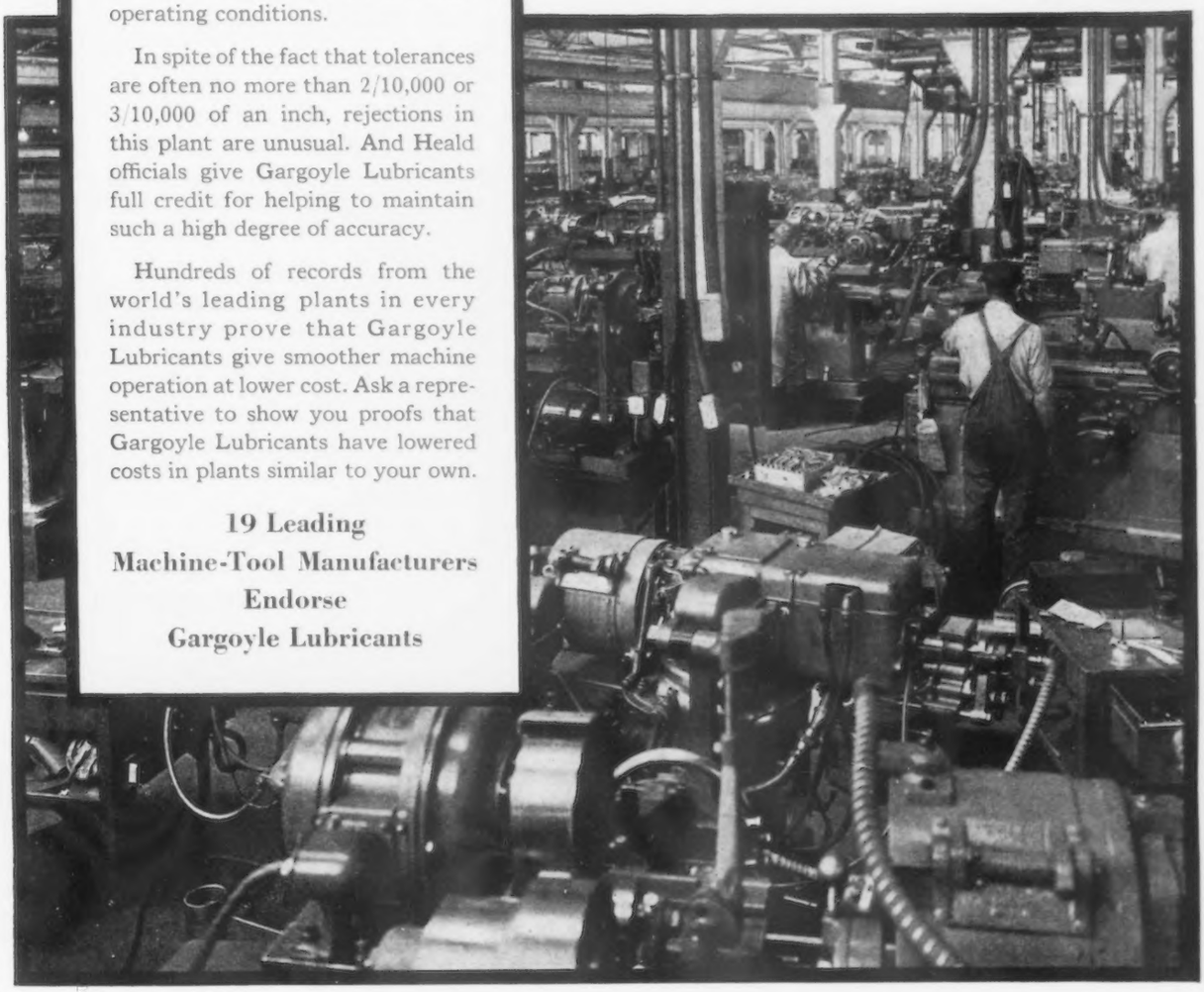
Rejections few with Gargoyle Lubricants

Every grinding machine made by the Heald Machine Company faces a series of rigid inspections before it leaves the plant. Each part is inspected before it comes to the assembly floor. Then, the assembled machine is put through a running-off test. Finally, further severe tests are made under actual operating conditions.

In spite of the fact that tolerances are often no more than 2/10,000 or 3/10,000 of an inch, rejections in this plant are unusual. And Heald officials give Gargoyle Lubricants full credit for helping to maintain such a high degree of accuracy.

Hundreds of records from the world's leading plants in every industry prove that Gargoyle Lubricants give smoother machine operation at lower cost. Ask a representative to show you proofs that Gargoyle Lubricants have lowered costs in plants similar to your own.

19 Leading Machine-Tool Manufacturers Endorse Gargoyle Lubricants



Running-off department where Heald machines are tested under actual manufacturing conditions. Gargoyle Lubricants are used for these tests.

GARGOYLE

Lubricating Oils

VACUUM OIL COMPANY, Inc.

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Nickel Steels Resist Embrittlement

(Concluded from page 53)

two of the most important features shown in Fig. 5 in relation to the boiler plate problem.

In steels with about 0.15 per cent carbon, the addition of nickel or the increase in carbon content resulted in decreases in grain growth accompanying recrystallization. The advantage of defeating grain growth by nickel additions, rather than by carbon increase, is that the steel retains higher ductility and higher notch toughness. Also, the actual average grain size was smaller in the steels with 2 per cent or more of nickel than it was in the unalloyed steels.

The importance of providing resistance to grain growth is due to the fact that any appreciable increase in grain size is accompanied by decreases in toughness. The nickel steels are useful for boiler plate because they combine initially high toughness with a high degree of resistance to grain growth (mainteance of initially high toughness).

Summary

The results described may be summarized, as in Fig. 6, to show the influence of various nickel contents upon some of those fabrication and service properties of general interest in the application of low-carbon structural steels. The curves shown are all approximate but establish the trends of the effects of nickel upon aging and recrystallization phenomena.

Briefly, increase in nickel content in low-carbon steels (1) reduces aging embrittlement, such as is shown by impact or slow bend tests on notched bars, (2) reduces the grain size which can develop on recrystallization and, (3) raises the temperature at which strain markings of maximum intensity are observed in strain-etch tests.

Appreciable benefits are derived with additions of around 2 per cent of nickel but the improvements increase with increase in the nickel content up to about 5 per cent (the limit investigated).

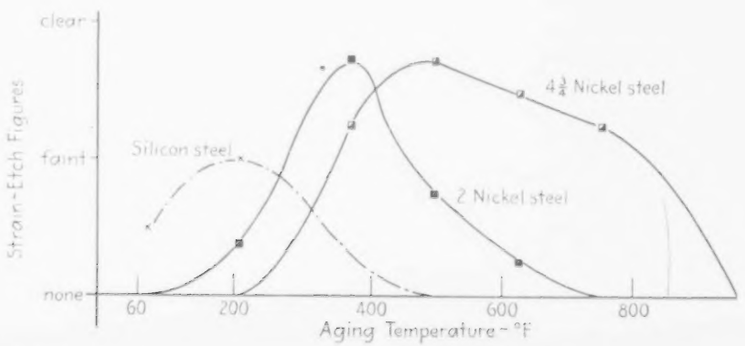

Fig. 5—Effect of aging temperature on the intensity of strain markings in strain-etch tests of carbon and nickel steels.

Dust Separators Operating at 250-lb. Pressure

(Concluded from page 65)

Cleveland, now uses it to build pressure vessels which conform to the Class 2 requirements of the A.S.M.E. boiler construction code.

Such a vessel is the partly completed dust separator shown in Fig. 2, which unit is designed to operate at 250 lb. pressure. It is entirely arc welded by the shielded arc process, with the baffles and interior fittings fabricated in the same manner. All welding was done under the Ohio Machine company's special procedure, using the "Stable Arc" welders and "Fleetweld" electrodes manufactured by the Lincoln Electric Co.

These dust separators are 20 ft. long and 48 in. in diameter, one piece of ⅞-in. plate being rolled to form the entire unit. Elliptical heads 1⅛ in. thick are used. The edges are planed for welding with the inside U deeper than the outside.

After the units have been planed, rolled and fitted, the deeper U is filled with successive beads of weld metal deposited by the shielded arc process. Each layer of metal is thoroughly peened and special precautions are taken to assure proper cleaning of each bead before the next is deposited. When the seam is filled the plate is then chipped out from the other side, having nothing but arc deposited steel at the joint. The outside of the seam is then welded with each layer of metal being cleaned and peened.

With such a procedure, engineers are able to calculate the welded seam as stronger than the plate metal. Each of the six dust separators manufactured at this plant was tested at 680 lb. hydrostatic pressure without any sign of leakage or failure.

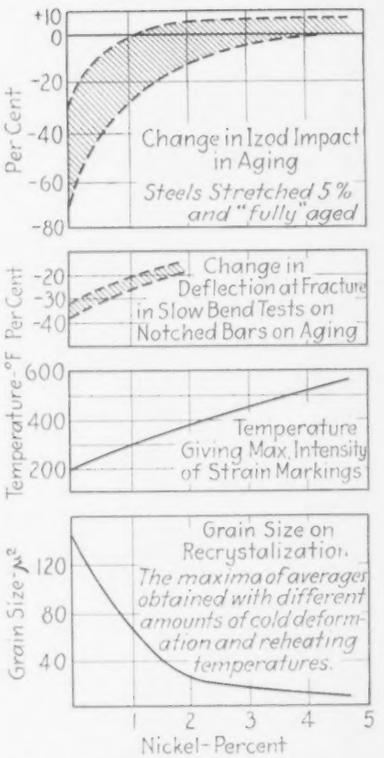

Fig. 6—Summary of the effects of nickel on aging and recrystallization phenomena in low-carbon structural steels.

Commodity Price Level Is Slightly Upward

The Bureau of Labor Statistics of the United States Department of Labor announces that the index number of wholesale prices for the week ended July 2 stands at 64.4, as compared with 64 for the week ended June 25. This index number, which includes 784 commodities or price series, weighted according to the importance of each article and based on the average prices in 1926 as 100, shows that an increase of six-tenths of 1 per cent has taken place in the general average of all commodities for the week of July 2, when compared with the week ended June 25.

Orders for porcelain enameled flat ware in May were valued at $519,270, against $532,439 in April, according to reports received by the Bureau of the Census from 26 establishments. In the first five months of 1932 orders aggregated $2,608,728 as compared with $3,266,529 in the corresponding period of last year.